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photographic speed page 164

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Standardization is dynamic, not static. It means not to stand still, but to move forward together.

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FEATURES

NEWS

DEPARTMENTS

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ASA

THE COVER: Photographers using black-and-white film may count on more exact exposure as soon as film manufacturers have put the new standard method of measuring film speed into effect. "ASA" speed information given by the manufacturer with the film will reflect the new method.

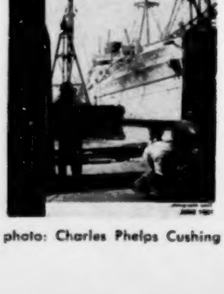
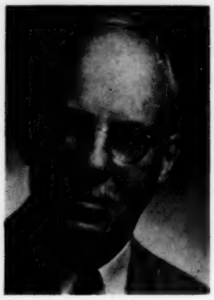


photo: Charles Phelps Cushing



This Month's Standards Personality

Herbert H. Hall

An ENTIRELY NEW CAREER following retirement—a career devoted to standards that may revolutionize the world's materials handling techniques—is the unusual experience of Herbert H. Hall. Mr Hall is originator and leader in development of "containerization" (integration of sizes of shipping containers which will make it possible for goods packed by a shipper to remain packed in the same container until it finally reaches its ultimate destination anywhere in the world, regardless of the method of transportation used).

Mr Hall's earlier career was spent with the Aluminum Company of America, starting as an industrial and mechanical engineer in 1919 and retiring as specialist on interplant logistics in 1957.

For almost 40 years he has taken an interest from time to time in standards for containers. It was an award presented by the Clark Equipment Company for a paper on "Material Handling Ten Years Hence" that started Mr Hall on his active work for containerization. In his award-winning paper, he presented the idea of integrated modular freight containers based on a series of standard sizes, and covering containers used in rail, highway, air, and water (both deep water and inland waterway) shipments. He predicted that this type of "containerization" would be pretty well established in 10 years. Since that time he has been doing his best to make this forecast come true.

At the suggestion of T. J. "Tom" Jolly, then vice-president of the Aluminum Company of America, and a past president of the American Standards Association, the idea of standard integrated freight containers was presented to ASA. A general conference in December 1956 recommended initiation of a project. As a result, Sectional Committee MH5, Standardization of Freight Containers, was formally organized in 1957, with Mr Hall as chairman of the committee.

Since his retirement, Mr Hall has set up his office at home as Consulting Materials Handling Engineer. Ninety percent of his time is spent on behalf of MH5. In the last two years, he took 53 trips on committee work.

Mr Hall is author of numerous magazine articles on "containerization." He is a Fellow and Life Member of The American Society of Mechanical Engineers and is past chairman of its Material Handling Division. He is also a Life Member of the American Ordnance Association, and a charter member of both the Association of Professional Material Handling Consultants and the American Material Handling Society. For five years he was chairman of the joint committee of ASME and AMHS on the *Materials Handling Handbook*.

"If I have any hobby," Mr Hall says, "it is an interest in standards for containers."

notes

OCTOBER 10-12 is the date – Houston, Texas, is the place for the 1961 National Conference on Standards. Subjects of vital importance to industry are featured—company and national standards; international developments; plastics; shipping and transportation; safety; data processing; how to put standards to work; a case study showing how standards have contributed to growth of an entire industry. A program is offered for the ladies. See page 180.

And, how about a Post-Convention tour to Mexico? A five-day tour is offered at $64 per person, double room; $83 single; plus $84 (present fare) round trip from Houston by air (meals not included). Before negotiating further, ASA must know if you are interested. For information, write Ken Ellsworth, American Standards Association, 10 E. 40 Street, New York 16, N. Y.

Experience gained with use of reversal color film has led to a change in ASA speed values for black-and-white film

photo: Eastman Kodak

New and Improved Standards for *Measuring Photographic Speed*

By J. L. Tupper

Nearly 300 American Standards in the field of photography have been approved since the first committee was organized in 1931 to carry on this work under the procedures of the American Standards Association.

Of these standards, none has aroused more widespread interest, precipitated so many technical discussions, and provided subject matter for so many newspaper and magazine articles as the American Standard Method for Determining Photographic Speed and Exposure Index.

The responsible committees of the American Standards Association have watched the reaction of the photographic public to this standard since its approval in 1947 and have taken careful note of new developments and new practices which relate to its utilization. By 1957, it became evident that a basic revision should be made and that new standards should be developed to extend the American Standard speed system to color films.

The work of revision began that year and culminated in the publication of the two new standards which are the subjects of this report: American Standard Method for Determining Speed of Photographic Negative Materials (Monochrome, Continuous-Tone), PH2.5-1960, and American Standard

Copies of American Standard Method for Determining Speed of Photographic Negative Materials (Monochrome, Continuous-Tone), PH2.5-1960, and American Standard Method for Determining Speed of Reversal Color Films for Still Photography, PH2.21-1961, are available at $1.00 each.

MR TUPPER, chairman of the subcommittee that developed the new American Standard method for determining photographic speed and exposure index, is with the Eastman Kodak Company's Research Laboratories, Rochester, N.Y. The subcommittee was organized by Sectional Committee PH2, Photographic Sensitometry, sponsored by the ASA Photographic Standards Board. Officers of Sectional Committee PH2 are M. G. Anderson, director of technology, Ansco, chairman; Dr J. P. Weiss, Photo Products Department, E. I. duPont de Nemours & Co, Parlin, N. J., vice-chairman; and Earl R. Clark, Film Testing Division, Eastman Kodak Company, Rochester, N.Y., secretary.

Method for Determining Speed of Reversal Color Films for Still Photography, PH2.21-1961.

There are two broad objectives that guide the work of drafting American Standards. First, the standards must be technically sound and readily usable in practice. Second, they must serve the needs of both producer and consumer as new techniques and technological developments advance the state of the art. Therefore, a good standard is not static; it grows and changes to keep abreast of progress and new trends in the field. The extent to which these objectives and principles are reflected in the new photographic speed standards will be recognized in the discussion which follows.

During the 1930's when the first photographic committee of ASA was organized, a major change was taking place in almost every phase of photographic practice. The first commercially successful reversal color film was introduced. Photoelectric exposure meters and photographic flash lamps appeared on the market. Miniature cameras were beginning to gain in popularity. Cameras equipped with coated lenses became available. A break-through had just been made in the production of ultra-speed emulsions. And the film speed rating situation was even more chaotic than usual. To the list of film speed systems of sensitometric origin that were in existence at the time, e.g., Scheiner, H and D, and DIN, there were being added a variety of film rating schemes devised by the manufacturers of photoelectric exposure meters. Each meter manufacturer had set the scale of his meter in such a way that it was impossible to use film rating values that would work with other meters. Furthermore, the film ratings supplied by the meter manufacturers did not always lead to uniformly exposed negatives on different types of films, nor was the same level of exposure consistently indicated by different meters for the same film.

The task of the photographic committees of the American Standards Association was to bring some semblance of order out of this chaos. That they succeeded to a remarkable degree is a matter of record. The original ASA photographic speed standard, which remained essentially unchanged for a period of more than 15 years, rendered a great service to photography by establishing precise methods for determining speed and a uniform numerical scale for expressing the speed numbers. It is not surprising, however, that the original standard had some deficiencies which were revealed as experience with its use accumulated and as new materials and processes altered the photographic practices after which it was patterned.

The decision to revise and extend the speed standard was made not only because of the changes that had taken place in photographic practice during the past two decades, but also because of the awareness of the American Standards Association of its responsibility in the field of international standardization.

At the present time, the ASA holds the Secretariat for the international standardization work on photography being carried on by Technical Committee ISO/TC42 of the International Organization for Standardization (ISO). In this position, the American Standards Association is expected to take the leadership in developing photographic standards. Under ISO procedures, copies of the 1947 edition of the American Standard on speed were submitted as a draft proposal to the members of ISO/TC42 for consideration. This draft proposal, with only minor modifications, was approved by the majority of the member bodies of ISO, and it was formally adopted by the ISO council as ISO Recommendation R6 in 1955.

In spite of the existence of this ISO Recommendation, no positive action was taken by the member countries of ISO to replace the speed systems then in use in the various countries with the system recommended by ISO.

At the meetings of ISO/TC42 in 1958, it was apparent that ISO Recommendation R6 was not well suited to the needs of many of the countries and that an effort should be made to revise it in such a manner that it would be acceptable to and adopted by all nations. A working group was formed, under the chairmanship of the United States, to draft a new proposal. The delegates from the United States gained a valuable insight at the meeting of ISO/TC42 into the changes which should be made in ISO Recommendation R6 to make it an effective international document.

Both from a national and an international point of view, there appeared to be a fairly well defined course of action which should be taken by the committees of the American Standards Association. Certain features of the American Standard on speed should be revised in recognition of advances in the state of the art, and certain compromises should be made in an effort to establish a framework on which an ISO standard might be developed. It was believed that if these objectives could be successfully achieved in a new American Standard a major step would be taken toward a truly universal speed system.

In the sections which follow, a brief account will be given of the technological and philosophical considerations that influenced the course ultimately taken in drafting the new American Standards, PH2.5-1960 and PH2.21-1961.

Nomenclature

In previous American Standards, two different terms were used to express the relative sensitivity of photographic materials: *speed* and *exposure index*. In the new standards, the term *exposure index* has been abandoned. Only the term *speed* has been retained. It is necessary to examine the evolution of these terms to find the reason for this decision.

One of the first references to the term *speed* is found in the writings of Vero C. Driffield. In 1889,

Driffield made the following statement: "It has been customary hitherto to compare plates of different rapidity with the collodian wet plate as a standard, and modern dry plates are spoken of as being so many times as sensitive as wet plates. We feel strongly that one of the most pressing photographic requirements of the day is the adoption of a scientific unit of speed which will admit of an accurate comparison of the rapidity of different plates."

The line of reasoning that Hurter and Driffield[1] followed in developing a scientific basis for determining the speed of photographic plates set a pattern which was followed by others working in this field for the next 50 years. Photographic speed was considered by these workers to be directly related to the amount of exposure required to produce a specified degree of blackening of the photographic plate. Apparently, no attempt was made to investigate the relationship between this "blackening" exposure and the camera exposure required to produce a negative from which a satisfactory print could be made.

It was not until 1939 that a scientific paper appeared in which photographic speed was related to camera exposure. L. A. Jones,[2] the author of this paper, took the position that the information which the user of photographic material wishes to have about its sensitivity is how little exposure he can give in the camera and still obtain a negative from which a print of satisfactory quality can be made. Jones proposed a sensitometric criterion for determining the speed of negative materials which had been found to correlate very well with speed determined on the basis of practical photographic tests. This sensitometric criterion was incorporated in the original American Standard on photographic speed. In this standard, photographic speed was defined as follows: "Photographic speed is to be considered inversely proportional to the minimum exposure which must be incident upon the negative material from the scene element of minimum brightness in which detail is visible, in order that a print of as good quality can be made from the resultant negative as from negatives resulting from increased exposure of the same negative material." Since it had been shown by Jones that this minimum exposure could be determined by sensitometric procedures (the exposure at which the slope of the *D*-log *E* curve is equal to 0.3 of the average slope through a log exposure range of 1.5), speed was taken in the first American Standard as the reciprocal of this minimum exposure expressed in meter-candle-seconds.

There is an interesting implication in the definition of photographic speed as set forth in the original American Standard. According to this definition, the reciprocal of the speed number expresses the exposure in meter-candle-seconds which must be incident upon the material from the scene element of minimum brightness in which detail is visible, in order that a negative will be obtained from which an excellent print can be made. This definition implies that, to use the speed value in determining the correct camera exposure, a measurement must be made of the illuminance in the camera image associated with the scene element of minimum brightness. It is obvious that such a procedure is not practical and, therefore, has little meaning in actual picture-taking practice. It must be concluded, therefore, that speed defined in this manner is to a large extent academic and serves only to indicate the relative sensitivities of negative materials. The problem of expressing speed on a scale of numbers, which has more practical significance, was not included in the scope of Jones' original research.

It happened that, at the time the first American Standard was being drafted, two of the major photoelectric exposure meter manufacturers in the United States (General Electric and Weston) were in essential agreement on a scale of film rating numbers for use with their exposure meters. Representatives of these manufacturers, sitting on the ASA committee, reported favorable consumer reactions to the quality of negatives when the film ratings supplied by these manufacturers for their meters were used. It was found that by dividing the ASA speed value (as then defined) by 4 a scale of numbers was obtained which fell midway between the numbers used on the General Electric and Weston Exposure Meters. Agreement was reached that this second scale of numbers should be included in the standard and be identified as American Standard Exposure Index. This second scale of numbers was adopted and uniquely designated, even though the numbers stood in a constant ratio to the speed values, because it was found that when these numbers were used in conjunction with photoelectric exposure meters the indicated camera exposure was about 2½ times greater than the minimum required to produce a negative capable of yielding an excellent print. Since the term *speed* was intended to be invariably associated with the concept of *minimum exposure*, a different term was required to identify the scale of numbers which were intended for use with exposure meters.

There was another reason for including in the standard a separate scale of numbers for use with exposure meters. At that time it was believed that the average photographer would be constantly faced with the threat of underexposure unless he were guided to set his camera to an exposure somewhat greater than the minimum required for excellent results.

The amount by which the camera exposure could or should be increased over that required to produce the minimum exposure depends upon the latitude of

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[1] In 1890 F. Hurter and V. C. Driffield published a paper, "Photo-Chemical Investigations and a New Method of Determination of the Sensitiveness of Photographic Plates", which laid the foundation of modern sensitometry.

[2] L. A. Jones, "The Evaluation of Negative Film Speeds in Terms of Print Quality," *Journal of the Franklin Institute*, vol 227, 1939, pp 297 and 497.

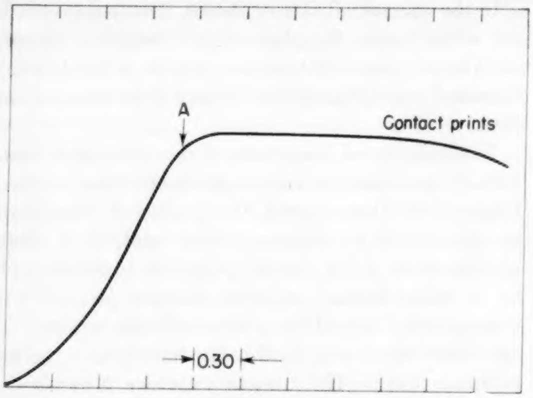

Figure 1

the photographic process. The plan, then, was to provide a means of taking the latitude into account by using a different factor between *speed* and *exposure index* for different types of materials or processes. In this way, the amount by which the recommended camera exposure should be increased over the minimum camera exposure would be predetermined for the photographer. On the basis of this argument, two different scales for rating the sensitivity of films would be necessary, one being uniquely related to the minimum exposure required to produce an acceptable result (speed) and the other being related to a kind of optimum exposure, which varied from one type of photographic material and process to another (exposure index).

As will be explained in the following section, experience gained with the use of exposure meters and exposure indexes since approval of the 1947 American Standard has clearly indicated that the dual concepts of speed and exposure index are not necessary, nor, in fact, desirable. It has been found that a scale of numbers which bears a constant relationship to the minimum exposure required to produce an excellent result is feasible and practical in all picture-taking situations regardless of the photographic process involved. In the new standard, PH2.5-1960, therefore, only one term is used as the quantitative measure of film sensitivity. Because, by long association, the term *speed* has been used in this connection, this term has been retained in the new standard.

Safety Factors

IT HAS ALREADY BEEN STATED that, when the original American Standard for determining speed was being formulated, many changes were taking place in the practice of photography, and experience with the new techniques and processes was very limited. The decision to establish a scale of exposure indexes, which for negative materials led to 2½ times more exposure on the average than the minimum required to produce a negative capable of yielding an excellent print, seemed fully justified at the time. Data published by L. A. Jones had shown that, when camera exposure is increased, the quality of the prints made from the resultant negatives increases to a maximum and then remains relatively constant over a wide range of exposures. Jones had used a curve such as that shown in Figure 1 to illustrate this point graphically.

In this curve, the quality of prints made by contact printing, and judged for quality by a large number of observers, is plotted as a function of the logarithm of the camera exposure given the negative from which the print was made. Once the camera exposure reaches a level indicated by Point A, only a slight increase in quality can be achieved by further increasing the exposure. Yet, according to this curve, there is no *loss* in quality from these increased exposures. It followed logically from these data that, since a significant loss in quality occurs when the exposure falls below Point A, it would be a wise precaution in taking photographs to aim for an exposure sufficiently greater than the exposure at Point A to ensure that errors in measuring the light or in the operation of the camera will not lead to underexposure.

On the basis of this argument and the favorable reports from photographers who had begun to use photoelectric exposure meters, the decision had been made in 1946 to standardize on a scale of exposure indexes which provided a safety factor in the exposure of negative materials.

In the 15 years following publication of the first edition of the American Standard for determining photographic speed (PH2.5-1947), there developed a growing dissatisfaction with this safety factor. Dissatisfaction increased as experience with exposure meters, miniature cameras, and the new films accumulated. Perhaps the most important single factor that contributed to this change in attitude was the increased use of small format cameras. Negatives produced in small format cameras are almost invariably printed by projection and frequently at high magnification. The quality of these prints is strongly affected by their definition, and in this respect the camera exposure plays an important part.

To illustrate this effect, the curve in Figure 2 is

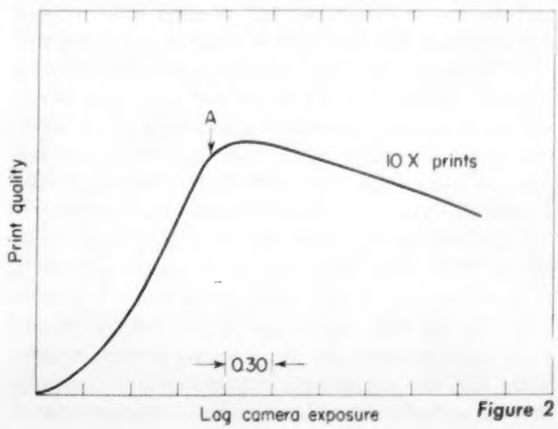

Figure 2

included for comparison with the curve in Figure 1. The curve in Figure 1 represents the effect of camera exposure on the quality of prints made by contact from large format negatives. In Figure 2, print quality is also shown as a function of camera exposure for the same negative material as that on which Figure 1 is based, but the prints, instead of being made by contact, have been enlarged approximately 10 diameters.

It is seen that as the camera exposure is increased beyond the minimum required to give an excellent print, Point A, the quality of the print soon decreases. This loss in the quality of enlargements made from negatives with increased exposure had not been given much weight in the decision to incorporate a safety factor in the exposure index formula, because it was believed that the majority of prints at that time were made by contact printing. It is now generally recognized that when this safety factor is reduced, the resultant negatives offer many advantages, such as easier focusing of enlargers, shorter printing times, less graininess in enlargements, and sharper pictures.

At the time the committee drafted the original speed standard, the view was generally held that there were certain advantages from the standpoint of definition in working with a thin negative, but that there was also the over-riding danger of underexposure and loss in quality resulting from underexposure would cancel any gain in definition. It was believed that the uncertainties in processing, lighting conditions, camera operation, etc, would cause a high percentage of negatives to be underexposed unless an appreciable safety factor were allowed in the computation of the camera exposure. Experience gained since then has disproved this belief.

As photographers have become more skilled in the use of exposure meters and as the meters themselves have become more reliable, the accuracy with which the available light can be evaluated is greatly improved. With the advent of antireflection coatings on camera lenses, variations among lenses in transmittance and in the flare light produced have been reduced and the uncertainties arising from these causes have become relatively unimportant. The adoption of more accurate controls in processing and printing operations and the use of continuous roll printers have reduced the variations that occurred in these stages of the process. Evidence also has accumulated which strongly suggests that most of the errors that arise from uncertainties in camera operation cause errors in the direction of overexposure rather than underexposure. But, perhaps more than any other factor, the experience gained with the use of reversal color films has changed the thinking in regard to the need of a large safety factor. With these materials, the exposure latitude is so short that only a very small safety factor is permissible. Yet the high percentage of successfully exposed color pictures made by the reversal process testifies to the fact that the uncertainties in exposure computation are actually not so large as had been anticipated.

In the face of all this evidence, it was decided that the safety factor for photographic negative materials need be no greater in the new revision of the American Standard (now PH2.5-1960) than it is for reversal color films.

To establish the magnitude of this new safety factor, a study was made of curves similar to those shown in Figure 3. In these curves, the quality of photographs as determined by psychophysical methods is plotted as a function of log camera exposure. Curve A applies to a monochrome negative-positive process (10X prints) and Curve B to a reversal color process. The two materials chosen for this illustration have the same exposure index. The camera exposure prescribed by an exposure meter calibrated in accordance with American Standard PH2.12-1957 corresponds to point M for an average scene. The minimum (first excellent, FE) and maximum (last excellent, LE) exposures which result in photographs of excellent quality are indicated.

In the case of the negative-positive process, there is a considerable exposure interval between the first and the last excellent picture. With the color film, however, this interval is much smaller.

Experience has shown that the optimum camera exposure for reversal color films is one that lies midway between the first and the last excellent exposures. This point is indicated at M.

The log exposure interval between the first excellent exposure and point M represents the safety factor which is operative when the camera exposure corresponds to point M. For negative materials, this factor is about 2.4 for an average scene. It has been found that on the average this factor is about 1.35 for reversal color films. These data suggested that a reasonable choice of minimum safety factor for both monochrome negative materials and reversal color films is about 1.2.

Point N on Curve A indicates the quality of the print which may be expected when the negative material is exposed with a safety factor of 1.2, assuming an average scene and average camera. The safety factor that is realized for most situations in which the scene and

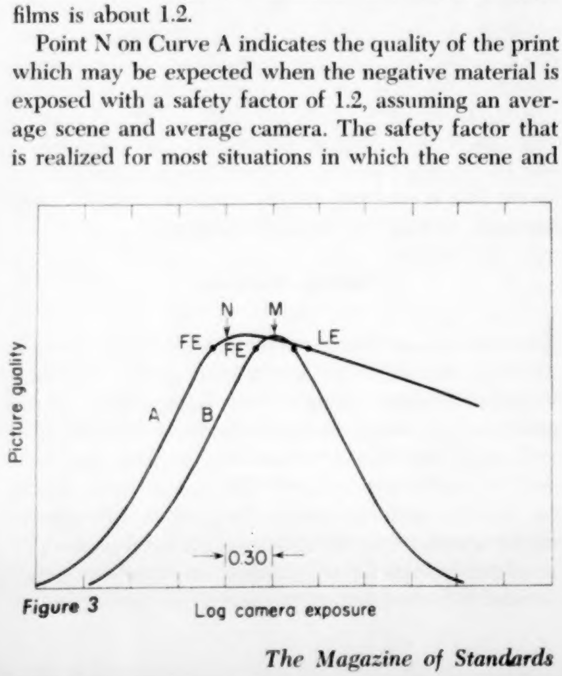

Figure 3

camera conditions differ from the average may be expected to fall within the range of 1.0 to 1.5.

The decision to adopt a uniform safety factor for negative materials and reversal color films made it possible to eliminate from the new standards the scale of numbers which had previously been identified as *exposure index*. Since the standards now specify the use of a scale of numbers which bear a constant relationship to the first excellent exposure for both negative and reversal films, the term *speed* can be justifiably adopted. The decision to adopt a safety factor of 1.2 has the additional attractive feature that the new speeds for negative materials will, in most cases, be exactly twice as great as the exposure index values previously specified.

A word of caution should be expressed at this point. Although the new speed numbers for negative materials are twice as great as the exposure indexes, no change has occurred in the sensitivity of the films to which these numbers are applied. Many photographers have adopted the practice of doubling the exposure index value in computing camera exposure for negative materials in order to obtain thinner negatives. This practice should be avoided when the new speed values are used.

Sensitometric Method

THE BASIC CONCEPT of photographic speed as set forth in the original American Standard implies that speed can be measured by making the best possible print from each of a series of negatives (which differ only in the exposure given) and then deciding by observation the minimum negative exposure that will lead to a print which is as good in quality as any print made from the series of negatives. This method of measuring speed can be followed by any photographer who is prepared to spend the effort required. The method is time-consuming and must be applied with great care and skill. Obviously, it is not suited to the testing of a large number of photographic materials or many samples of the same type of material. Fortunately, a more practical method of measuring speed was found in the field of sensitometry.

The operation of this method is illustrated in Figure 4. It consists of plotting the density-log exposure curve of a photographic material for a given set of conditions (exposure, development, etc). A log exposure range of 1.5, represented in Figure 4 by the distance AB, is then moved along the horizontal axis from left to right until the gradient of the curve at the low end of the range, point C, is 0.3 of the average gradient over the entire range; that is, when the tangent of angle a is 0.30 of the tangent of angle b. The exposure E_m corresponding to this fractional gradient point C represents the sensitometric parameter from which speed is computed.

The testing technique described in the original standard for obtaining the *D*-log *E* curve from which

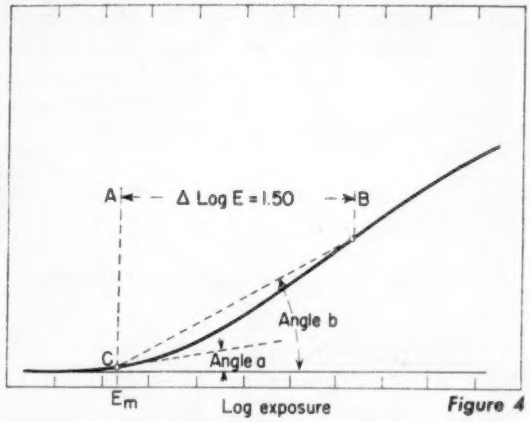

Figure 4

the speed parameter was derived specified the details of exposure, processing, and densitometry. Certain features of this testing technique have been revised in the new standard. Specifically, a change has been made in the quality of the light source, the composition of the developer, and the extent of development, as well as the sensitometric criterion of speed.

The so-called fractional gradient criterion of the original standard has the desirable feature of giving speeds that correlate closely with those obtained by practical picture tests. It has the objectionable features, however, of being inconvenient to use and subject to experimental error.

Most other sensitometric criteria for measuring speed that had been evolved prior to the advent of the fractional gradient criterion were based on a fixed density or a threshold density measurement.

L. A. Jones and his co-workers were able to demonstrate conclusively that density, per se, gives no indication of the ability of the photographic material to produce a satisfactory negative. Jones contended that only by consideration of the gradient aspects of the negative material could a reliable indication be obtained of its effective speed.

In spite of the data which had been accumulated to validate this point and in spite of the acknowledged theoretical soundness of the principle on which it was based, the fractional gradient criterion had never found widespread acceptance outside of the United States and the United Kingdom. It has been opposed primarily on the grounds that it is less convenient to use and is subject to greater experimental error than a fixed density criterion.

The possibility of effecting a compromise between the fractional gradient method of the American Standard and the fixed density method of comparable national standards of certain other countries was suggested by a paper published by Nelson and Simonds[3] in 1956. Nelson and Simonds had made an exhaustive study of the sensitometric characteristics

[3] C. N. Nelson and J. L. Simonds, "Simple Methods for Approximating the Fractional Gradient Speeds of Photographic Materials." *Journal of the Optical Society of America.*

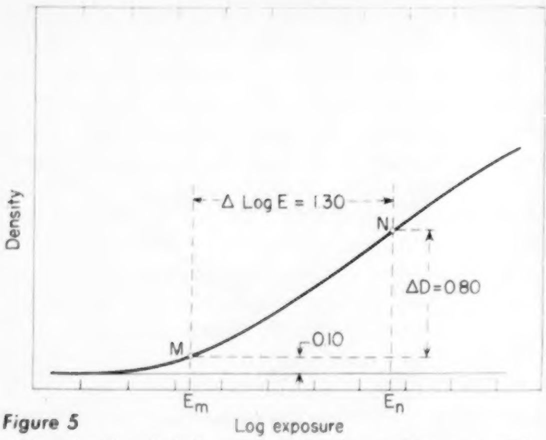

Figure 5

of hundreds of different kinds of negative materials. They found that the relation between fractional gradient speeds and speeds based on a density of 0.1 above fog is systematically related to the average gradient of the *D*-log *E* curve on which the measurements are made. It followed from this observation that if the development conditions are controlled so that a fixed average gradient is obtained, there should be a constant relation between speeds measured by these two criteria.

It now appeared feasible to adopt a fixed density criterion provided the extent of development is specified in such a way that a fixed average gradient is obtained. The specification of a fixed average gradient is justified by the fact that it corresponds to the common photographic practice of developing negatives so that they print satisfactorily on a "normal" grade of photographic paper. Such a specification reflects the trend in photographic processing and printing which has taken place during the past two decades.

Because the use of a 0.1 fixed density speed criterion in combination with a suitable development specification offers the convenience and precision of the fixed density criterion and retains the practical significance of the fractional gradient criterion, this method has been adopted in the new American Standard, PH2.5-1960. The operation of the method is illustrated in Figure 5. In this figure, the density-log exposure curve of a photographic negative material which has been developed to a specified average gradient is plotted. Two points are shown on the curve at M and N. Point M is located 0.1 above fog-plus-base density. Point N lies 1.3 log units from point M in the direction of greater exposure. The developing time of the negative material is so chosen that point N lies at a density interval $\triangle D = 0.80$ above the density at point M. When this condition is satisfied, the exposure E_m corresponding to point M represents the sensitometric parameter from which speed is computed.

In addition to a change in the development conditions specified in the testing technique, the new standard revises the specification of the light source used in exposing the test samples.

In the original standard, the source consisted of an incandescent tungsten lamp and a two-component liquid filter which together closely approximated the spectral energy distribution of mean noon sunlight. This light source was defined by the International Congress of Photography of 1928 in establishing the international unit of photographic intensity.

Recent studies, which led to the specification of a light source for exposing daylight-type color films, have shown that the quality of radiation should closely approximate that of sunlight plus skylight as modified by the transmission of a typical camera lens. It was found that such an energy distribution can be achieved by a suitable combination of an incandescent lamp and a two-component liquid filter of unique composition. Such a light source was specified in American Standard Sensitometric Exposure of Daylight-Type Color Films, PH2.11-1958. Since the conditions of daylight under which color films are exposed are the same as those encountered in the exposure of negative black-and-white films, it was decided to adopt this source in the new standard.

Numerical Scale

THE NUMERICAL SCALE which was devised for expressing photographic speed in the original American Standard presented the speed numbers in arithmetic units. The scale was divided into steps such that the ratio of the numerical values of adjacent steps was in a constant ratio of 1.26 or the cube-root-of-2. For example, the following numbers represent uniform increments in this scale: 50, 64, 80, and 100. Each number is greater than the preceding one by a factor of approximately 1.26. The scale is reasonably intelligible to all those who think in terms of arithmetic units, since it is obvious that a speed of 100 is twice as great as a speed of 50, or that twice the exposure is required for a film having the speed of 50 as that required for a film having the speed of 100. It is somewhat more difficult to deduce the significance of the difference between intermediate steps since it must be recognized, for example, that the ratio of 50 to 64 is essentially the same as the ratio of 80 to 100. The interpretation normally given by photographers to this scale is that a difference in one step corresponds to a change of "one-third of a stop" in exposure.

Evidence points to the fact that such a scale of numbers is most readily accepted by most of the photographers in the United States.

In other parts of the world, the situation is quite different. In the familiar DIN, Scheiner, and BSI speed scales, the steps are also in a cube-root-of-2 progression; however, the numbers which identify each step are not arithmetic units but instead are logarithmic. The *difference* between the numbers which identify each step on the scale is constant rather than the *ratio* of these numbers. For example,

on the DIN scale the steps are identified by a uniform sequence of numbers, such as 21, 22, 23, and 24. One unit on this scale corresponds to an exposure ratio of approximately 1.26 or a logarithmic increment of 0.10. Thus, it requires a difference of three units to double the speed. To those not accustomed to the use of logarithms, the concept of this scale may be difficult. It is surprising, therefore, that this scale has been so widely accepted and used by photographers in other countries.

There appears to be a reasonable explanation for the acceptance of logarithmic speed numbers by photographers who have given the system a fair try. The explanation lies in the logarithmic nature of the lens aperture scales with which all photographers are familiar. Photographers learn to think of exposure changes in terms of *f*-stops or fractions of *f*-stops. For instance, if a film is used which has twice the speed of another, it is customary to express the change in exposure required as a "one stop difference." Thus, photographers have adopted almost intuitively a scale in which a difference of one unit represents a constant ratio of exposures.

In one of the early revisions of the original American Standard, recognition was given to the popular appeal of the logarithmic form of expressing speed numbers in other countries. An alternate scale was approved in which American Standard speeds were expressed logarithmically. The purpose of incorporating the logarithmic scale was to provide a means of rating films which were to be used in countries where exposure meters were marked in logarithmic units. Inclusion of the logarithmic scale was a tacit admission that it was only in the United States that the arithmetic scale was generally accepted.

At the meetings of Technical Committee ISO/TC42, Photography, in 1958, there was a strong expression of opinion that an effort should be made to devise a single scale of speed numbers which would be acceptable to and adopted by all nations, to the exclusion of all other scales. The advantages of such a system appeared obvious for both commercial and technical reasons. There was reluctance to accept either the arithmetic scale of the American Standard or the logarithmic scales of other national standards. A new idea was needed. It happened that such an idea had already begun to take shape in the subcommittee of the American Standards Association which was considering the development of standards for photoelectric exposure meters.

The introduction of the Exposure Value scale for marking coupled shutters and lens apertures suggested the feasibility of a system in which the parameters of the camera exposure equation were expressed in logarithmic form to the base 2. The camera exposure equation normally takes the form:

$$\frac{A^2}{T} = \frac{BS_x}{K}$$

where A is the *f*-number of the lens aperture, T is the shutter time in seconds, B is the scene luminance, S_x is the arithmetic speed of the photographic material and K is a constant. By expressing each of these parameters in logarithmic form to the base 2, the equation then takes the form:

$$A_v + T_v = B_v + S_v = E_v$$

where:

$$A_v = \log_2 A^2$$
$$T_v = \log_2 1/T$$
$$B_v = \log_2 \frac{B}{NK}$$
$$S_v = \log_2 NS_x$$
$$E_v = \text{Exposure Value}$$
$$N = \text{Constant}$$
$$K = \text{Constant}$$

This scheme appears to have many attractive features. The first and most obvious advantage is that it permits the computation of exposure by simple addition. Slide rules and tables are not required, provided all of the parameters are expressed in this form. Another attractive feature is that the numbers are small, whole numbers and each numerical increment represents a constant change in each of the parameters by a factor of 2. In Table 1, comparative arithmetic speeds, S_x, and logarithmic speed values, S_v, are shown. The most sensitive film currently available has a logarithmic speed value of less than 9°.

The advantage of such a scale for the marking of exposure meters and automatic cameras is obvious. Instead of numbers which consist of as many as four digits, the scale would contain only single-digit numbers with reference marks indicating intermediate values. The improvement in the legibility and compactness with which such scales can be inscribed on equipment appeals to engineers, designers, and photographers.

American Standard PH2.5-1960, in addition to specifying a method for determining arithmetic speed numbers, specifies a method for determining the quantity S_v, the logarithmic speed value. In the foreword, it is recommended that exposure meters, exposure computers and exposure tables be redesigned to incorporate these logarithmic values.

Table I

Arithmetic Speed S_x	Logarithmic Speed S_v
3	0°
6	1°
12	2°
25	3°
50	4°
100	5°
200	6°
400	7°
800	8°
1600	9°
3200	10°

It must be acknowledged that the process of converting aperture and shutter markings on cameras and exposure meters to this logarithmic scale is a major one. It may take many years and perhaps a new generation of photographers before the complete system will find general acceptance. However, it is not required that the complete system be universally adopted before use can be made of some of its important attributes. It is firmly believed that in the new American Standards the ground work has been laid for a single universal speed system which is sound in principle and convenient to use and which will, in time, replace all others now in use. A Draft ISO Proposal is being considered with this purpose in mind.

Reversal Color Films

WITH THE GREATLY EXPANDED USE of reversal color films and the increase in varieties and types that are commercially available, there has grown a very real need for a method by which the speeds of these materials can be accurately and realistically determined.

After more than four years of study, a method which is believed to satisfy these requirements has been evolved and is incorporated in American Standard PH2.21-1961.

The same type of systematic investigation that led to the solution of the problem of determining speed for negative materials was undertaken for reversal color films. Under the procedures of the American Standards Association, the task of preparing a standard for determining the speed of reversal color films was assigned to Subcommittee PH2.12. A task force of this subcommittee, composed of personnel of wide experience in this field, carried on a cooperative study of the problem.

The first step taken by Subcommittee PH2.12 was to reach agreement on the conditions under which reversal color film should be exposed, processed, and viewed. The next step was to derive a sensitometric procedure by which the results of practical photographic tests could be predicted. The results of this study can most effectively be explained by reference to the curve in Figure 6. In this figure, the density-log exposure curve of a reversal color film is plotted. Point H is located on the curve at a density of 0.20 above the minimum density. A straight line originating at point H is drawn tangent to the curve at point S. If the tangent point should occur at a density greater than 2.0 above the minimum density, then point S is taken on a curve where the density is 2.0 above the minimum density. The exposures E_h and E_s corresponding to points H and S are used to compute the exposure E_m by use of the formula $E_m = \sqrt{E_s \cdot E_h}$. The exposure E_m represents the sensitometric parameter from which speed is computed.

The significance of the sensitometric method which is illustrated in Figure 6 and which forms the framework of the new standard may not at first be apparent. There has been a widespread belief among photographers that with reversal color films, one exposes for the highlights "and lets the shadows take care of themselves." This rule is the converse of the rule that is sometimes applied to the exposure of negative materials, which states that one "exposes for the shadows and lets the highlights take care of themselves" or "one exposes for the shadows and develops for the highlights." For the exposure of negative materials this rule has proved to be quite useful.

In the case of reversal color film, the experimental evidence does not confirm the belief that it is the reproduction of the highlights rather than the shadows that determines correct exposure.

The studies of Subcommittee PH2.12 clearly showed that the average observer prefers a color photograph in which the highlights are slightly washed out but in which the shadow detail is present, to a reproduction in which the highlights are accurately reproduced at the expense of good shadow rendition. The result is that the speed derived by psychophysical methods from actual pictures correlates best with a sensitometric evaluation of speed in which equal weight is given to the reproduction of highlights and shadows. Therefore, the sensitometric parameter E_m is taken as the geometric mean of the exposures which represent the useful limits of the lower and upper portions of the D-log E curve.

The formula by which speed is derived from the sensitometric parameter E_m leads to a speed value which agrees very closely in almost every case with the exposure index which has been supplied by the manufacturers of reversal color films. The safety factor which is realized when this speed number is used in conjunction with photo-electric meters calibrated in accordance with American Standard PH2.12-1957 is approximately 1.2 for most color films, and is therefore directly comparable to the speed numbers determined by the method specified in the new standard for photographic negative materials.

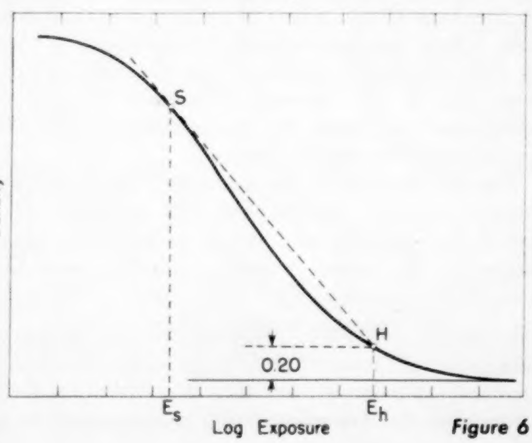

Figure 6

SEMICONDUCTORS IN THE WORLD MARKET

by Stephen L. Levy
Associate Editor
the solid state journal

" . . . NATIONAL CUSTOM, NATIONAL PRIDE, AND THE 'NOT INVENTED HERE' ATTITUDE . . . ARE PROBLEMS . . . TO BE OVERCOME."

OVER THE LAST SEVERAL YEARS it has become increasingly apparent that a manufacturer of semiconductor devices should regard his market from a world-wide rather than from a domestic point of view. In fact, many of the manufacturers in the United States have an affiliation with a foreign semiconductor manufacturing operation.

When a manufacturer considers his market world-wide rather than simply domestic, a whole new set of problems present themselves. Among these are the language problem in technical literature and data sheets, the problem of technical definitions, graphical symbols, and letter symbols. There is the problem of standard procedures for rating, testing, and defining the characteristics of various devices. On top of these problems, which are basically of a technical nature, one must consider the problem of world-wide pricing, taking into consideration tariff barriers, local competition, etc, and the effect of feedback of prices established for the market in one country on the markets in other countries, including the domestic one.

To relieve the problems in the technical areas, at the Zurich meeting in 1957 the International Electrotechnical Commission established SC39/2, subcommittee on semiconductor devices, which has been meeting once each year since. In 1958 the meeting was in Vasteras, Sweden, in 1959 in Madrid, and in 1960 in London. This year the meeting is scheduled for Interlaken, Switzerland.

This subcommittee, which became a main committee as of January 1, 1961 with the designation TC/47, has as its objective the promotion of international commerce in the area of semiconductor devices through standardization of mechanical packaging, nomenclature, and definitions, test methods, ratings and characteristics, graphical and letter symbols, etc. Representation on this committee is substantially world-wide—each interested member country sending a delegation of one or more individuals. At the last meeting held in London in June of 1960, the following countries were represented:

Czechoslovakia	Hungary	Sweden
France	Netherlands	Switzerland
Germany	Norway	USSR
Japan	Britain	USA
Italy		

The United States has been very active in this work, sending a delegation to the meeting each year.

As one might expect in the area of international standardization, compromise is perhaps the main road to progress. There are problems concerning national custom, national pride, and the "not invented here" attitude to be overcome. The United States is probably as hampered by these influences as any country. As an example, most European countries do not have the same hesitancy in stating their mechanical dimensions in both millimeters and inches on their data sheets as we have. It will be some time before the manufacturers in the United States will be doing this. Admittedly, the pressures appear to be more immediate for the European countries, but I am certain it would be to our advantage to do this in the very near future since it would be an indication of our real interest in the international market. We should recognize that we are in a world market and act accordingly with consideration for those factors which will facilitate world-wide commerce.

The IEC is the instrument for the resolution of technical problems. The engineering people, the spec writing people, the people engaged in data sheet preparation for the semiconductor industry in the United States would be well advised to develop a familiarity with the work of the IEC and with the standards and practices that it has established in the area of solid state devices. In some European countries, documents issued by the IEC have legal stature, and adherence to IEC standards and practices is extremely helpful if not absolutely necessary in the transaction of business.

The problems of the international market for semiconductor devices have significance to the equipment manufacturer and to the military as well as to the device manufacturer. NATO has recently felt it necessary to start drafting a Standard NATO Agreement covering semiconductor devices. The necessity for this comes about because the individual NATO countries each have their own standard military specifications. In the United States we use MIL-Standard 19500, the United Kingdom uses K1007, France has its own specification, etc. As a result, an equipment manufacturer who finds it necessary to procure semiconductor devices in two or more of the NATO countries would presently find it impossible to buy to a uniform specification. In considering the Standard NATO Agreement for semiconductor devices, the NATO committee is drawing heavily on the work done to date by the IEC.

It is not too early to recognize that the market for solid state devices is a world market. The longer we delay recognition of this fact, the more difficult it will become to reconcile those differences which one would normally expect to arise between countries having different languages and customs.

Reprinted from the solid state journal.

A PIONEERING STANDARD - -

Radiation Protection in Uranium Mines

By Duncan A. Holaday

THE FIRST OF A SERIES of American Standards dealing with radiation hazards in the atomic energy industry has just been completed. Identified as N7.1-1960,[1] this standard covers problems involved in the mining of uranium ores and subsequent treatment of the ores to produce relatively pure uranium concentrates.

Uranium ores are produced in several hundred mines operating primarily in Colorado, Arizona, Utah, New Mexico, and Wyoming. Approximately 5,000 miners were engaged in this activity in 1960 and their product was treated by about 24 mills employing two or three thousand additional workers. The mines vary in size from two-man operations to those employing 400 men, with an output varying from a truckload of ore per week to 3,000 tons per day. The mill capacities range from 200 tons to 3,600 tons of ore per day.

This extreme variation in size of operations creates many difficulties in dealing with the health and safety problems inherent in the operations. In the majority of instances the difficulties are compounded by the remoteness of the mines from water, power, and sources of supplies.

These conditions, which are not encountered in any other phase of the atomic energy field, had to be considered in drawing up the standard in order to produce a document whose provisions would protect the health of the workers without being unrealistic. For example, a method of determining the concentration of air-borne radioactive materials in mine atmospheres that required laboratory analyses would be of limited usefulness; the situation in the mine might well have been changed by the time the report was received, thus severely limiting the value of the samples for control purposes.

The standard is offered as a guide to industrial and governmental bodies. It is designed to represent a cross section of the thoughts of this group in a field in which data are not available to permit definite answers on all questions.

Basically, the recommendations of the National Committee on Radiation Protection (NCRP), as given in National Bureau of Standards Handbooks 59 and

[1] American Standard Radiation Protection in Uranium Mines and Mills, (Concentrators), N7.1-1960, $2.00. The work was sponsored by the Atomic Industrial Forum and the National Safety Council, and supervised by the ASA Nuclear Standards Board.

69 are used. The standard interprets these recommendations and adjusts them to the working situations. An exception is the case of radon where the NCRP recommendation is specified in terms that make it extremely difficult to evaluate a mine situation. In this case, the standard recommends a method of evaluation which can be used in all mines, even though it is not possible to interpret the results in terms of the NCRP recommendation. The level used as a basis for recommendation in the standard is thought to be comparable to the NCRP recommendations in the majority of mine situations. It is hoped that epidemiological studies now under way will clarify the situation and permit the development of an MPC (maximum permissible concentration) based on experience.

The standard summarizes the record of human exposure to radon; lists the potential radiation health hazards to which workers may be exposed; and gives suggestions and recommendations for evaluating these exposures and correcting any undesirable conditions found.

Different atmospheric concentrations of radioactive particulates require different types of corrective action. This is the principle that is followed. Therefore, the standard makes a series of recommendations that depend upon the atmospheric conditions which are found. Examples of this procedure are the recommendations given for the control of miners' exposures to radon daughters which are listed below.

"*Controlled Condition.* If the 13-week weighted average exposure of the workers to radon daughters is less than the MPC given in 4.1.2, the conditions may be considered to be controlled, and no action is necessary.

"*Condition Requiring Additional Samples.* If samples in any working area show a concentration of radon daughters exceeding the MPC, but less than three times this level, sufficient additional samples shall be

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taken to determine the workers' weighted average exposure for 13 weeks.

"*Condition Requiring Correction.* If samples show a concentration of radon daughters more than three times the MPC, but less than 10 times this value, corrective action shall be initiated.

"*Unsatisfactory Condition.* If samples show a concentration of radon daughters greater than 10 times the MPC, immediate action shall be taken to reduce the workers' exposure and correct the condition."

Similar detailed recommendations are given for other exposure situations. The necessity of making adjustments in the MPC values to fit varying exposure situations is pointed out in NBS Handbook 69, but the NCRP assumed that such adjustments would be made by an individual experienced in the field and that the conditions would be stable enough to permit predictions of exposure. The uranium mining and milling industry has few such individuals, and operating conditions vary widely. Therefore, the N7 committee believed that a series of detailed interpretations treating broad categories of exposure situations would be most useful.

The committee attempted to consider all possible exposure situations, and, where indicated, prepared recommendations for controlling exposures. Recommendations are included for possible contamination of food in lunch room areas, contamination of clothing, and similar problems. Reference is also made to the necessity of evaluating potential health hazards created by non-radioactive toxic agents, which in some instances may be more important than the radiation hazards.

The standard has several appendixes which describe suggested survey procedures, methods of analysis, and control measures which have been used by a number of industrial and governmental groups and are believed to give reliable results. These appendixes contain background information and suggestions of a type that is normally included in an American Standard as a part of the standard itself. In the opinion of the committee, this industry is of such recent development that knowledge of analytical methods and control practices is not readily available; therefore, the committee decided that descriptions of such procedures should be attached to the standard.

The committee believes the standard will be useful to all groups who are concerned with the mining of uranium ores and the production of concentrates. As experience is accumulated, the N7 Committee will review the data that are developed and will make any revisions in the standard that are indicated.

SECTIONAL COMMITTEE N7, Radiation Protection, is made up of representatives of industrial and governmental groups concerned with the atomic energy field and is chaired by R. G. McAllister, Liberty Mutual Insurance Company. Saul Harris and G. T. Brown, of the Atomic Industrial Forum, have each served as secretary of the committee. The subcommittee which drew up the new standard on uranium mines consisted of:

- Duncan A. Holaday, U.S. Public Health Service, Chairman
- W. B. Harris, U.S. Atomic Energy Commission
- J. Howard Bird, U.S. Bureau of Mines
- L. H. Harrison, U.S. Bureau of Mines
- P. W. Jacoe, Colorado Department of Public Health
- Carl R. Jensen, New Mexico Department of Public Health
- Paul W. McDaniel, Union Carbide Corporation
- Travis H. Redman, Texas-Zinc Minerals Corporation

CROSS-INDEXING
Industry and Military Specifications and Standards

Reported by W. L. HEALY

In the preceding four issues of *The Magazine of Standards*, under the above heading, industry has been encouraged to cooperate with the Bureau of Ships in its current project of indexing comparable industry and military specifications. Comment by industry is encouraged on the basis that many companies' own evaluation between industry and government specifications will constitute an invaluable supplement to the work being done by the American Standards Association under its current contract with the Bureau of Ships. This work can be accelerated thereby, with mutually beneficial results. Since this index will be made available to industry at large, much expense in both time and money will be saved by the individual companies when unnecessary and repetitive work is eliminated.

It is again suggested that when any company becomes aware of an instance where an adequate and comparable industry standard or specification, such as AIA, ASTM, NEMA, AISI, or any others, or an American Standard, can be substituted for a military document, it be brought to the attention of W. L. Healy, staff engineer, American Standards Association, 10 East Fortieth Street, New York 16, N. Y.

The following are some recent examples of work performed under the contract:

(1) QQ-A-327B, 6/21/1951—ALUMINUM ALLOY PLATE AND SHEET (6061)

ASTM B209-60T, alloy GS11A or AA alloy 6061, tempers O, T4, and T6, are equivalent to the Federal Specification QQ-A-327B. The chemical and mechanical requirements are the same. The ASTM specification could be substituted for the federal specification for procurement. Mechanical properties and tolerances for sizes or thickness of plates or sheets not specifically covered by the ASTM specification can be had by specifying in the ordering data.

Any specific requirements, particularly in regard to sampling, inspection, and packaging, should be specified in the ordering data.

(2) QQ-A-318c, 11/17/1952—ALUMINUM ALLOY PLATE AND SHEET (5052)

ASTM B209-60T, alloy GR20A or AA #5052 are comparable to QQ-A-318c tempers O, H32, H34, H36, H38, H112, and F, in regard to chemical and physical characteristics except for a difference in the content of zinc. ASTM specification permits 0.20% zinc, while Federal Specification QQ-A-318c permits 0.10% zinc max.

Any specific requirements, particularly in regard to sampling, packaging, and inspection, should be indicated in the ordering data.

(3) MIL-T-15005c, 4/15/1957—TUBES, 70-30 and 90-10 COPPER-NICKEL ALLOY CONDENSER AND HEAT EXCHANGER

ASTM B111-60, 70-30 copper nickel, normally annealed or drawn, stress-relieved tempers, and 90-10 copper-nickel tubes, light-drawn or annealed tempers, are equivalent to MIL-T-15005c compositions 70-30 and 90-10 and could be used for procurement.

The mechanical properties are comparable except that ASTM material 70-30 allows a maximum of 33.0% nickel whereas the MIL-T-15005c was limited to 32.0%.

The material 90-10 of both specifications is comparable except that the iron content of the military specification ranges from 1.00-1.75%, while the range in the ASTM is 0.5% to 2.0%, and the military specification permits 0.75% manganese, while the ASTM allows 1.0% max. The ASTM specification, 70-30 material, has mechanical properties requirements of 52,000 psi tensile, 18,000 psi yield, and for the 90-10 material a tensile of 40,000 psi and 15,000 psi yield.

The MIL-T-15005c requires the following mechanical tests:

(a) Expansion test
(b) Flattening test
(c) Hydrostatic test

Any specific requirements in regard to sampling, packaging, or inspection should be specified in the ordering data.

(4) WW-T-731C, TUBES, STEEL AND OPEN HEARTH IRON, SEAMLESS AND WELDED, BOILER USE, 8/22/1950

ASTM A 83-60T, Seamless Steel Boiler Tubes, Grades A and B, are equivalent to Federal Specification WW-T-731C, compositions A and B, respectively. The chemical properties requirements are the same.

Each tube 1¼ in. O.D. and over should be identified by continuous markings at intervals not less than 3 ft, including manufacturer's name or trade mark, seamless "S," material "S" steel or "I" open hearth iron and symbol "ASTM A 83" and grade "A" or "B" as appropriate. ASTM A 178-60T, Electric-Resistance-Welded Steel and Open Hearth Iron Boiler Tubes, grades A and B, are equivalent to Federal Specification WW-T-731C, compositions A and B, respectively, and could be used for procurement.

The chemical properties requirements are the same. Each tube 1¼ in. O.D. and larger should be marked with paint, at intervals of not less than 36 in. The identification should include the manufacturer's name or trade mark, the symbol "ERW", mark indicating material, "S" steel or "I" open hearth iron as appropriate, ASTM 178 grade "A" or "B", and indication if electrical tested.

Any specific requirements in regard to packaging, sampling, or inspection should be indicated in the ordering data.

(5) MIL-T-QQ-20155B, TUBE AND PIPE, CARBON-MOLYBDENUM ALLOY STEEL, SEAMLESS, 9/28/1951

ASTM A 355-60T, grade P-1, is comparable to MIL-T-0020155B, types A, B, and C, and could be used for procurement.

The chemical properties requirements are the same. The mechanical properties requirements vary slightly. The military specification requires a tensile of 60,000 psi min, and a yield of 35,000 psi, while the ASTM specification requires a tensile of 55,000 psi and yield of 30,000 psi for grade P-1. The elongation requirements (min longitudinal) are the same.

The military specification requires a flattening test for each type or size over 2.375 in. O.D., while the ASTM specification specifies a flattening test of 5% of tubes from each heat-treated lot. The military specification requires a minimum wall thickness, whereas the ASTM specification is based on a nominal wall thickness. The military specification requires the identification of all tubes ½ in. and over O.D. and each length of pipe. This shall be done with recurring symbols, printed in ink, at intervals not greater than 3 ft. The symbol will consist of manufacturer's name or trade mark and the identifying designation "A355 PI SMLS." For tubes under ½ in. O.D. the same information printed on tags and fastened to each end of each bundle is required.

Any specific requirement, other than above, in regard to packaging, sampling and inspection should be specified in the ordering data.

(6) QQ-S-571C, SOLDER: ALLOY, TIN LEAD ALLOY, AND TIN ALLOY; FLUX CORED RIBBON, AND WIRE AND SOLID FORM, 9/30/1947

ASTM B 32-60T, Solder Metals, alloys 70B, 63B, 60B, 50B, 40B, 35C, 30C, 20C, 5B, 95TA, 1.5S, and 2.5S are equivalent to the Federal Specification QQ-S-571C compositions SN70, SN63, SN60, SN50, SN40, SN35, SN30, SN20, SN5B, SB5, AG15, and AG2.5 respectively and could be used for procurement. Compositions SN62, PB90, AG5.5 of the Federal Specification are not listed in the ASTM specification. The chemical properties requirements are comparable, with some minor differences. The ASTM specification lists arsenic 0.04% max in alloy 95TA and 0.02% max in all other alloys, while the Federal Specification does not list arsenic in the equivalent compositions.

ASTM 95TA has a range of Sb 4.5-5.5%, Bi 0.25% max (0.08% max is proposed), Fe 0.04% max, miscellaneous 0.005% max, Al 0.005% max, arsenic 0.04% max, Ca 0%—while its comparable Federal Specification composition SB5 allows Sb 4.0-6.0%, Bi 0%, Fe 0.08% max, Zn 0.03% max, Al 0.03% max, Ar 0%, Ca 0.03% max.

ASTM 1.5S and 2.5S each has Cu max 0.08%, while the comparable Federal compositions AG1.5 and AG2.5 each permit Cu 0.3% max.

Bars, ingots, containers, coils, and spools should be identified with alloy type and manufacturer's name or trade mark. In addition, container, coils, and spools should be marked with net weight and coils and spools with dimension of ribbon or outside diameter of wire thereon. Rosin Flux Cored Solder can be procured under specification ASTM B 284-60T(1) types (NR) NATURAL ROSIN (GUM OR WOOD ROSIN) equivalent grade to ASTM D 509; (2) type (MR) ROSIN MODIFIED (ASTM D-804); (3) type (D) DUCTILE ROSIN (Phostic Rosin); (4) type (A) ACTIVATED ROSIN.

Any specific requirements in regard to packaging, sampling, or inspection, should be specified in the ordering data.

(7) WW-T-787B, TUBE, ALUMINUM ALLOY, ROUND, SQUARE, RECTANGULAR, AND OTHER SHAPES, DRAWN, SEAMLESS, 5052, 7/17/1941

ASTM B 210-58T, Aluminum Alloy Drawn Seamless, is equivalent to Federal Specification WW-T-787A and could be used for procurement.

The mechanical properties requirements are comparable.

The chemical properties requirements are the same, except that where the Federal Specification requires 0.10% max Zn, the ASTM allows 0.20%. Both the Federal Specification and the ASTM specification require a maximum tensile of 35,000 psi for the O temper and a minimum of 34,000 psi and 39,000 psi for tempers H34 and H38. The Federal Specification lists a maximum yield of 20,000 psi for the O temper while the ASTM lists a minimum yield of 10,000 psi for the O temper, 26,000 psi for H34 and 31,000 psi for H38. The Federal Specification requires markings for identification. Unless otherwise specified, each length of tubing should be marked with the name or trade mark of the manufacturer, the alloy number, or the specification number and temper used. All this information should be clearly legible and should be applied with indelible ink at intervals not less than 3 ft. When the tubes are ½ in., or less O.D., a metal tag or similar label should be securely fastened to each bundle and contain the above information.

Any specific requirements in regard to sampling, packaging, or inspection should be specified in the ordering data.

(8) WW-T-789B, TUBE, ALUMINUM ALLOY, ROUND, SQUARE, RECTANGULAR, AND OTHER SHAPES, DRAWN, SEAMLESS, 6061-and 6062, 4/23/1951

ASTM B 210-60T, alloys 6061 and 6062, tempers O, T4, and T6 are equivalent to Federal Specification WW-T-789B, alloys 6061 and 6062, tempers O, T4, and T6.

The chemical and mechanical properties requirements are the same.

Both specifications permit a range of Cr for alloy 6061, 0.15-0.35%; and for 6062, 0.04-0.14%.

Unless otherwise specified in contract or order, the tube ½ in. or greater O.D. should be marked for identification by painting, stamping, or otherwise spaced in consistently recurring sequels at intervals of 3 ft throughout the lengths.

Bundles or lengths, sizes less than ½ in. O.D., should have two tags containing the required information. The required information is:

(1) Manufacturer's name or trade mark
(2) Commercial designation, specification, diameter, and wall thickness.

Any specific requirements in regard to sampling, packaging, or inspection should be specified in the ordering data.

(9) MIL-P-15047B PLASTIC-MATERIAL, LAMINATED THERMOSETTING SHEETS, NYLON FABRIC BASE, PHENOLIC-RESIN, 7/28/1950

NEMA Pub. No. LP-1-1959

ASTM D 709-55T, type V (nylon base), grade N-1

is identical to military specification MIL-P-15047B, type NPG, except that the NEMA standard includes values for intermediate thickness not covered in the military specification.

The test methods include:

ASTM D 790, D 229, D 150, D 495

This NEMA specification No. LP-1-1959 could be used for procurement.

Any specific requirement in regard to packaging, inspection, or sampling should be specified in the ordering data.

(10) MIL-P-997B, PLASTIC-MATERIAL, LAMINATED, THERMOSETTING, ELECTRICAL-INSULATING SHEETS, GLASS-CLOTH SILICON RESIN, 12/14/1950

NEMA Pub. No. LP-1-1959

ASTM D 709-55T type IV, grade 7) is identical with the properties specified in MIL-P-997B, type GSG, except that the NEMA standard includes values for intermediate thickness not covered in the military specification.

The test methods include:

ASTM D 790, D 229, D 150, D 495

NEMA specification No. LP-1-1959 could be used for procurement.

Any specific requirement in regard to packaging, inspection or sampling should be specified in the ordering data.

(11) MIL-P-15037B, PLASTIC-MATERIAL, LAMINATED THERMOSETTING SHEETS, GLASS-CLOTH MELAMINE RESIN, 8/10/1951

NEMA Pub. No. LP-1-1959

ASTM D 709-55T type IV, grade 5 is identical with the properties in MIL-P-15037B, type GMG, except that the NEMA standard includes values for intermediate thickness not covered in the military specification.

The test methods include:

ASTM D 790, D 229, D 150, D 495

NEMA specification No. LP-1-1959 could be used for procurement.

Any specific requirement in regard to packaging, inspection, or sampling should be specified in the ordering data.

(12) MIL-P-79B, PLASTIC-MATERIALS, LAMINATED, THERMOSETTING, RODS AND TUBES, 8/30/1950

ASTM D 709-55T, type I, cellulose paper-base, class X, XX, XXX, are comparable to MIL-P-79B, type PBM (rolled tubes only), type PBG paper-base phenolic-resin, and type PBE paper-base-phenolic resin (tubes, molded and rods only) respectively. The ASTM specification could be used for procurement.

ASTM D 709-55T, type II, cellulose fabric-base, class C, CE, and LE, are comparable to MIL-P-79B type FBM cotton fabric-base phenolic-resin (tubes, rolled only), FBG cotton-fabric-base phenolic-molded (tubes and rods only) and type FBE cotton-fabric-base phenolic-resin. The ASTM specification could be used for procurement for tubes rolled and molded and rods molded.

ASTM D 709-55T type IV glass base group 5 is comparable to MIL-P-79B type GMC glass-fabric-base, melamine-resin (tubes, rolled and rods, molded only).

Any specific requirement in regard to sampling, inspection, and marking should be specified in the ordering data.

Are These Cases Work Injuries?

This is the fortieth installment in the current series of rulings as to whether unusual industrial injury cases are to be counted as "work injuries" under the provisions of American Standard Method of Recording and Measuring Work Injury Experience, Z16.1-1954 (Reaffirmed 1959). The numbers in parentheses refer to those paragraphs in the standard to which the cases most closely apply. Decisions on unusual industrial injury cases are issued periodically by the Z16 Committee on Interpretations. Reprints of each double page of cases published in THE MAGAZINE OF STANDARDS can be obtained in quantity from the American Standards Association at $1.50 per 50 copies.

Sectional Committee Z16 is sponsored by the National Safety Council and the Accident Prevention Department of the Association of Casualty and Surety Companies.

INDEX TO CASES 400-800. An index to Cases 400-800 has now been completed. Arranged numerically by the number of the applicable paragraph of American Standard Z16.1-1954 (R1959), the index includes the number of the case indexed and a key letter indicating what the decision was in each case. Each index reference includes a brief description of the case.

Reprints of Cases 400-800, with the index, are now available from ASA at $2.50. Discounts for quantity orders may be obtained on request.

CASE 846 (5.2)

An office employee was carrying 2 trays of cards weighing approximately 40 lb. These trays were 25 in. long and 8 in. wide. While carrying these trays a distance of 50 ft, he felt a sharp pain in his back. He did not report this pain to his supervisor until the following day. The pain persisted, and he left work at 3:00 P.M. for a medical checkup. The doctor diagnosed the case as a lumbar spine injury brought about by the above-described incident, and ordered the employee not to report back to work until released from his care. The company asked if this should be considered as a clear record of an accident or an incident as mentioned in paragraph 5.2.

A safety engineer had investigated the circumstances and had declared that no unsafe condition existed and that the handling of such small weights was not considered an unsafe act or condition.

Decision: This should be considered a work injury in accordance with the ultimate extent of disability. The committee believed that when this employee handled the 2 trays of cards and received the pain, this should be considered meeting the requirements of 5.2 (a). They also noted that the doctor diagnosed the back strain as occurring from this activity. The committee believed this meets the requirements of 5.2 (b). The committee believed that the fact that a safety engineer had found no unsafe act or unsafe condition did not change the decision.

CASE 847 (1.6)

This was an inquiry regarding the procedure for counting injuries which occurred to seamen aboard ship, but while off duty. In paragraph 3.2.1 the standard indicates that in computing manhours for seamen on shipboard, only those hours during which employees were actually on duty should be counted. The question was concerned with injuries occurring during nonduty hours, particularly if the injury arose out of the hazards of the environment.

Decision: The committee decided that all injuries to seamen aboard ship should be counted as work injuries if they arose out of the hazards of the environment. The committee commented that the inherent hazards of seafaring are present around the clock and, because of the nature of his employment, a seaman is required by that employment to live constantly with those hazards. He cannot withdraw from them at the end of his duty period as can a shore worker. The committee believed, therefore, that the injuries experienced by seamen during their off-watch hours should be counted as work injuries if they arose from hazards of the environment in which the employment requires them to spend their time.

CASE 848 (1.5)

An employee had finished work for the day and had punched out. However, before leaving the company property, he received a pass from his supervisor for the purpose of picking up scrap lumber to take home for firewood. These were old boards with nails in them which were to be hauled or thrown away. While he was picking up this lumber, he stepped on a nail which caused a puncture wound with infection. As a result the employee lost 7 days from work.

Decision: This should be considered an industrial injury and included in the work injury rates in accordance with the ultimate extent of disability. Although the employee had punched out, the injury occurred while he was still on company premises. In addition, the committee commented that this employee was performing a service to the company, as well as to himself, and the injury resulted from an unsafe condition of the environment of employment.

CASE 849 (5.2)

One afternoon, five pipefitters were assisting in docking a ship by handling the lines from the ship. Two of the fitters were handling the aft line. The ship was docked and securely tied without incident. During the following morning, approximately 16 hours after the ship had docked, one of the pipefitters contacted his supervisor and asked permission to go to the medical department, stating his back was sore when he got out of bed that morning and that he thought he might have strained his back when helping to dock the ship the previous morning. He said that he would like to check with the doctor to, at least, have it on record. The employee complained of a pain in the lower lumbar region. Finding no evidence of muscle spasm in the lower lumbar region, the doctor did, however, find a very mild muscle spasm in the thoracic area, but nothing of any significance.

The supervisor observed this employee's actions on three different occasions later the same day. The man rode a bicycle and carried on with his work without any complaints. Approximately 4½ weeks later (during which time the employee carried on his normal duties as a pipefitter without incident), the company was informed that this employee had gone to another physician and had been hospitalized. The employee's physician could not find any muscle spasm, but stated that there was nerve root irritation. The employee was, therefore, hospitalized and placed in traction. This case was again discussed with the company doctor who said that, in accordance with his findings upon the initial examination, he believed that there was no problem in the lower lumbar region at the time of his examination. He, therefore, did not believe that the employee's hospitalization could have arisen out of the incident of docking the ship.

Decision: This incident should not be considered an industrial injury and should not be included in the frequency and severity rates. The committee commented that the description of the case which had been provided did not meet the requirements of paragraph 5.2 of the standard.

CASE 850 (5.3)

A plant electrician was occasionally required to bend his neck quite severely in working on ceilings, in installing conduit, pulling electrical wires through conduit, and drilling holes, and so forth. This employee began to lose time with the diagnosis "aggravation of pre-existing cervical arthritis with probable degenerated disc and nerve root compression." The company doctor stated that the employee's neck complaint could be aggravated from any neck-bending activity. The condition was considered a disability which had progressed over a period of time.

Decision: This case should be considered an industrial injury and included in the work injury rates in accordance with the ultimate extent of disability. The committee commented that since the diagnosis of the case was aggravation of cervical arthritis and since the company doctor said that the employee's neck complaint could be aggravated from any neck-bending activity, it was their opinion that paragraph 5.3 of the standard had been satisfied and any resulting disability should be considered a work injury under the standard. The source of the original condition did not appear important to the present findings.

CASE 851 (5.18)

A secretary was sitting at her desk with both elbows on the desk top. She had a sharp pencil in the right hand with the point pointing toward her eye. She turned her head to the right and the end of the pencil struck the cornea of the right eye. This resulted in abrasion of the right cornea and mild iritis. This employee was under the doctor's care for 5 days. The company doctor recommended that she remain off the job for 4 days. Because the diagnosis had been "mild iritis" and because, in some other cases with a severe iritis, the employees had, in fact, continued with their work and had not lost any time, the company questioned if this should be counted in the injury rates.

Decision: This should be considered a disabling industrial injury and should be included in the frequency and severity rates with a time charge of 4 days. The committee commented that this was a work injury since it arose out of and in the course of employment, and the only point of issue was whether or not it should be classified as a temporary total disability or a nondisabling medical treatment case. The committee called attention to paragraph 5.18 which stated that, in case of doubt as to the degree of disability, the classification should be based on the decision of the physician engaged or authorized by the employer. In this case, the company doctor, in the exercise of his best professional judgment, determined that the employee should not work during the healing period. The committee, therefore, believed this should be considered a disabling injury.

CASE 852 (5.2)

An employee in a chemical plant was doing maintenance work. He was working in a "column." He was climbing down from one tray to another, a distance of approximately 4 feet, when he felt a burning pain in his left hip. He worked the rest of the shift, but had extreme pain and difficulty in getting out of bed the next morning. He lost time as a result of this back pain. The company stated that this was the normal procedure for moving from one part of the column to another and that such climbing had been done previously without any incident. The company doctor stated that the act of climbing down a distance such as described might have resulted in a strain of the lower back which could have precipitated the symptoms which followed.

Decision: This should be considered an industrial injury and included in the work injury rates in accordance with the ultimate extent of disability. The committee commented that the act of this employee in stepping a vertical distance of 4 feet between trays constituted an incident which could have imposed substantial strain on the back. The immediate occurrence of pain established a clear association between the exertion and development of a disabling back injury. The committee believed that this satisfied the requirements of paragraph 5.2 (a). The fact that the activity had been performed repeatedly before with no adverse results was not a justification for rejecting this association as coincidental. The committee also believed that the opinion of the company doctor, that there may have occurred a strain on the lower back which could have precipitated the symptoms, satisfied the requirements of paragraph 5.2 (b).

PRELIMINARY PROGRAM

Twelfth National Conference on Standards

Rice Hotel, Houston, Texas October 10, 11, 12, 1961

Tuesday, October 10

10:00 A. M. OPENING SESSION
Sponsor: American Standards Association

Presiding
John R. Townsend, President, American Standards Association

Chairman:
H. C. Ball, Humble Oil and Refining Company, Baytown, Texas

Welcome to Houston
Honorable Albert Thomas, Congressman, Eighth District, Houston, Texas

Welcome from Industry
John R. Suman, Howard Coonley Medalist, 1958

Keynote Address
Speaker to be announced

Review of the Year
Vice-Admiral George F. Hussey, Jr, USN (ret), Managing Director, American Standards Association

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1:30 P. M. SESSION TWO

Philosophy and Practice of Standards
Sponsor: ASA Company Member Conference

Chairman:
to be announced

PART ONE

Company Standards
Dwight F. Hollingsworth, Principal Standards Engineer, E. I. duPont de Nemours & Company, Wilmington, Delaware

Session Two, Part One, continued

Industry Standards
Speaker to be announced

Technical Society Standards
Speaker to be announced

American Standards
T. E. Veltfort, Managing Director, Copper and Brass Research Association; Past Chairman, ASA Standards Council

Government Standards
Willis S. MacLeod, Director, Standardization Division, Federal Supply Service, General Services Administration

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3:15 P. M. SESSION TWO

PART TWO

International Organization for Standardization
Harold Massey, Chairman, ASA Standards Council; Managing Director, Gas Appliance Manufacturers Association

International Electrotechnical Commission
Speaker to be announced

Pan American Standards Committee
T. A. Marshall, Jr, Executive Secretary, American Society for Testing Materials

American-British-Canadian Engineering Unification Conference
R. P. Trowbridge, Director of Engineering Standards, General Motors Corporation

6:00-7:30 P. M. SOCIAL HOUR

Wednesday, October 11

9:00 A. M. SESSION THREE

Plastics Standards
Sponsor: Society of the Plastics Industry

Chairman:
to be announced

Plastics Standards: Who Writes Them?
C. Howard Adams, Monsanto Chemical Company Plastics Division, Springfield, Mass.

Session three, continued

Plastics Standards Serve Industry
George Anderson, National Tube Division, U.S. Steel, Pittsburgh, Pennsylvania

Plastics Standards Serve the U.S. Government
Dr F. W. Reinhart, Division of Organic and Fibrous Materials, National Bureau of Standards, Washington 25, D.C.

International Standards for Plastics
W. E. Brown, Past-Chairman USA National Committee, ISO/TC 61, Plastics, Dow Chemical Company, Midland, Michigan

10:45 A. M. SESSION FOUR

Optimum Distribution Through Standardization
Sponsor: American Society of Mechanical Engineers and American Material Handling Society

Chairman:
B. S. Sines, Executive Vice President, Southern Pacific Lines

Presentation by Fred Muller Jr, Arthur D. Little, Inc, on standardization affecting shipping and transportation; the status of work underway in ASA Sectional Committee MH 5 (sizes of shipping containers) at both the national and international levels; the benefits of industry application of American Standards already available.

RECEPTION

AWARDS LUNCHEON

2:00 P. M. SESSION FIVE

Advantages of Safety Standards

Sponsors: Gulf Coast Chapter of the American Society of Safety Engineers

Chairman:

E. C. McFadden, Vice-President, Texas Employers' Insurance Association, Dallas, Texas

The Economics of Safety Standards

H. A. Hansen, Safety Engineer, Diamond Alkali Company, Pasadena, Texas

Session five, continued

Regulatory Safety Codes
J. U. Parker, Chief Safety Engineer, Humble Division, Humble Oil and Refining Company, Houston, Texas

American Standards for Nuclear Safety
Speaker to be announced

3:45 P. M. SESSION SIX

Putting Standards to Work
Sponsor: National Association of Purchasing Agents

Chairman:

Roy Stockton, Materials Manager, Reed Roller Bit Company, Houston, Texas

Use of Value Analysis in Putting Standards to Work
C. W. Doyle, Convair, Fort Worth, Texas

How We Started a Standardization Program in Our Company
Boyd C. Jackson, City Public Service Board, San Antonio, Texas

Putting Standards to Work (slide film presentation)
R. C. Fast, Pan American Petroleum Corporation, Fort Worth, Texas, and Chairman, District No. 2, Value Analysis-Standardization Committee, National Association of Purchasing Agents

Thursday, October 12

9:00 A. M. SESSION SEVEN

Data Processing Standards
Sponsor: Office Equipment Manufacturers Institute

Chairman:
I. C. Liggett, Director, Systems Standards, International Business Machines Corporation, New York, N. Y.

Status Report on ASA X3—Data Processing Standards for the United States and the Relationship to International Data Processing Standards
H. S. Bright, Chairman, ASA X3; Engineering Director, OEMI, New York

Character Recognition
B. W. Pollard, Chairman, ASA X3.1; Director of Engineering, Burroughs Corporation, Detroit, Michigan

Character Codes and Input/Output Media
I. C. Liggett, Chairman, ASA X3.2

Programming Languages
J. C. Chu, Chairman, ASA X3.4; Manager, Univac Equipment Center, Remington Rand Univac Division, Sperry Rand Corporation, Philadelphia, Pennsylvania

Information Retrieval
Allen Kent, Deputy Director, Information Retrieval Center, Western Reserve University

11:00 A. M. SESSION EIGHT

Case Study of Industry Growth Through Standardization
Sponsor: Mobile Homes Manufacturers Association

A presentation of standards work undertaken by MHMA and the benefits to industry and consumer already derived and expected in fuller measure for the future. Chairman and speakers to be announced.

For the Ladies

Houston offers a variety of interesting places to see and tour, and an informal program is being planned which will permit the ladies to have as much free time as they want for shopping and browsing.

One event scheduled for Wednesday afternoon, October 11, will be a boat trip from the Port of Houston along the ship channel to San Jacinto battleship monument, the site of Santa Anna's defeat at the hands of Sam Houston's Texas Army. Moored near the statue is the battleship "U.S.S. Texas."

A ladies hospitality room will be maintained during the three days of the Conference.

STANDARDS FROM OTHER COUNTRIES

Members of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Information about those standards not selected for listing in THE MAGAZINE OF STANDARDS may also be obtained from the ASA Library. Orders for these standards may be sent to the country of origin through the ASA office. Titles are given here in English, but, except where otherwise indicated, documents are in the language of the country from which they were received. For the convenience of readers, the standards are listed under their general Universal Decimal Classification number. In ordering copies, please refer to the number following the title of the standard.

389 METROLOGY. WEIGHTS AND MEASURES

Germany (DNA)

Inch-millimeter conversion table from 1 to 1000 micro-inch DIN 4892, Sheet 3*

542 CHEMISTRY. LABORATORY EQUIPMENT

Germany (DNA)

Laboratory glassware: narrow-neck standing bottle without stopper DIN 12035

France (AFNOR)

Beakers NF B 35-001

Precision laboratory thermometers, long type NF B 35-502

India (ISI)

Separating funnels IS:1575-1960

Netherlands (NNI)

Chemical analysis. Weighing, calibration of weights and volumetric glassware NEN 3101

United Kingdom (BSI)

Methods of sampling superheated steam from steam-generating units BS 3285:1960

USSR

Laboratory glass condensers GOST 9499-60

Glass cylinders for hydrometers GOST 9545-60

621.4 INTERNAL COMBUSTION ENGINES

Germany (DNA)

Injector pump for Diesel motors, with flanges for mounting on 3-, 4-, and 6-cylinder motors DIN 73365, sheet 4

*Available in English

India (ISI)

Type testing of constant-speed internal combustion engines for general purposes IS:1600-1960

Type testing of variable-speed internal combustion engines for automotive purposes IS: 1602-1960

621.791 WELDING AND ALLIED TECHNIQUES

Germany (DNA)

Lead and tin solders DIN 1707*

Netherlands (NNI)

Resistance welding. Classification of materials of electrodes NEN 2372

United Kingdom (BSI)

General requirements for oxy-acetylene welding of mild steel BS 693:1960

621.88 MECHANICAL ATTACHMENT AND FIXING

Argentina (IRAM)

4 stds for bolts and nuts, different heads, metric thread IRAM 5193/6

Czechoslovakia (CSN)

Two-part rivets. Technical delivery code CSN 02 2039

2 stds for hollow and solid rivets, dimensions CSN 02 2387/8

Germany (DNA)

Large-head pins, 6-28 mm, semi-finished DIN 1436 Sheet 1*

Whitworth pipe threads DIN 2999*

*Available in English

2 stds for fillister head bolts, Whitworth, long and short DIN 30340, Sheet 2; 30341, Sheet 2

India (ISI)

Black hexagonal bolts (6-39mm) with nuts and black hexagonal (6-24mm) IS:1363-1960

Japan (JISC)

6 stds for different screw thread limit gages JIS B 0251/2, 0255/8

Netherlands (NNI)

Shipbuilding details (inland navigation). Rivets for hatches NEN 679

4 stds for slotted headless set screws. Whitworth thread, grade m, different points NEN 2256/9

Fastening pipe threads (non-tightening) NEN 176

Low hexagon nuts. Metric thread. Grade m NEN 2319

Eyebolts. Whitworth thread NEN 2347

Eyenuts. Whitworth thread NEN 2348

Poland (PKN)

Taper pins, 1/20 taper, 0.25-2 mm diameter PN M-54701

Spain (IRATRA)

Hammer-head bolts UNE 17 021

United Kingdom (BSI)

Specification for the use of high-strength friction grip bolts in structural steel work. General grade bolts BS 3294: Part 1:1960

USSR

Jaw (mouth) end of wrench and width across flat GOST 6424-60

Tolerances on trapezoidal screw thread for diameters from 10 mm to 300 mm GOST 9562-60

621.9 TOOLS. MACHINE TOOLS. MACHINING

Czechoslovakia (CSN)

Adjustable work rest CSN 24 3225
Angle plates CSN 24 3230
Sinusoidal vises CSN 24 4283
Bench centering devices for grinding and control CSN 24 4193
Crank presses, tests for accuracy CSN 21 0302

Germany (DNA)

Wrench for milling cutters DIN 849*
Milling cutters, concave DIN 855*
2 stds for slot milling cutters with Morse and straight shank DIN 326/7
Taper reamers with straight shank for Morse taper DIN 204

Japan (JISC)

Driving square of small tool shanks JIS B 4002
7 stds for different kinds of milling cutter JIS B 4204/6,4208/9, 4211/12
3 stds for reamers JIS B 4231, 4401/2
T-slot cutters JIS B 4217
Metal saw, circular JIS B 4219
3 stds for hand taps, metric, Whitworth, unified JIS B 4436/8
2 stds for parallel bench vises JIS B 4620/1
2 stds for hand and hacksaw blades JIS B 4751/2
2 stds for circular saws and band saws for wood JIS B 4802/3

Netherlands (NNI)

3 stds for twist drills NEN 840, 848/9
3 stds for attachments of milling cutters NEN 1581/3
2 stds for turning tools, carbide tipped NEN 1979, 1990

Poland (PKN)

T-slots PN M-55091
Chucks with Morse taper shank PN M-60211

United Kingdom (BSI)

Hobs for gears for turbine reduction and similar drives BS 2062: Part 2:1960
Gear planing and shaping machines BS 3329:1961
Unit heads (slide type) BS 3295:1960

USSR

Nut taps-basic dimensions GOST 1604-60
Flat thread-rolling dies GOST 2248-60
Machine-hand taps. Basic dimensions GOST 3266-60
Double angle disc cutters with inserted carbide blades. Basic dimensions GOST 6469-60
Nut hook taps-basic dimensions GOST 6951-60
Taps. Tolerances on threads GOST 7250-60
Wood tenoning machine. Standards of accuracy GOST 7321-60
Machine taps for metric thread, diameter from 0.25 to 0.9 mm GOST 8859-60
Threading dies for metric threads, diameter 0.25 to 0.9 mm GOST 8860-60
Vertical diamond boring machine tools, basic dimensions GOST 9520-60
Hand taps-basic dimensions GOST 9522-60
Cutting tools. Shank diameters, driving squares and flats. Holes for driving squares GOST 9523-60
Carbide-tipped blades for counterbores and shims for them GOST 9537-60
Combination inserted carbide blade counterbores GOST 9538-60
Thread rolls GOST 9539-60
Twist drills. Diameter ranges and tolerances GOST 885-60
Double angle disc cutter with inserted carbide blades. GOST 6469-60
Hand taps. Basic dimensions GOST 9522-60
Horizontal diamond boring machine tools with movable bedplate. Basic dimensions GOST 9547-60
Woodworking band flat grinding machines. Basic technical data and dimensions GOST 9556-60

*Available in English

625.2 RAILWAY ROLLING STOCK

France (AFNOR)

2 stds for tire locking ring, rectangular cross section NF F 01-079/80
Mounting of tires of 140 mm NF F 02-403
3 stds for signal holding ferrules, different types NF F 14-002, -005, -401

Poland (PKN)

Clearance for narrow-gage rolling stock PN K-02052
3 stds for different man-holes for locomotive boiler cleaning PN K-74111/3
3 stds for wheels for narrow-gage freight cars PN K-91039

United Kingdom (BSI)

Wheel pairs for locomotives and rolling stock. Dimensions. Tires BS 3117: Part 3:1961

625.7 HIGHWAY AND ROAD ENGINEERING

Germany (DNA)

Bituminous binder for road surfacing, sampling and testing DIN 1995

Spain (IRATRA)

3 stds for different asphalt grades for highway paving UNE 41 101/3
2 stds for cut-back medium-and rapid-curing asphalt UNE 41 105/6

United Kingdom (BSI)

Bitumen macadam with crushed rock or slag aggregate BS 1621:1961
Recommendations for the use of bitumen emulsion (anionic) for roads BS 2542:1960
Methods for sampling and testing of mineral aggregates, sands and fillers BS 812:1960
Winter gritters for roads BS 1622:1960
Road marking materials. Hot-applied thermoplastic materials (inset type) BS 3262: Part 2:1960

666.8/.9 GYPSUM, LIME CEMENT

Austria (ONORM)

Rules for preparation of concrete ÖNORM B 2230

Canada (CSA)

Standards for concerete and reinforced concrete CS A23-1960
Concrete materials and methods of concrete construction CS A23.1
Methods of test for concrete CS A23.2

France (AFNOR)

Mixer for hydraulic binders NF P 15-411
Impact tester for hydraulic binder NF P 15-412
Molds for test pieces of hydraulic binders NF P 15-413
Vicat apparatus for testing hydraulic binders NF P 15-414

Germany (DNA)

Trass cement DIN 1167*

India (ISI)

Field slaking of lime and preparation of putty IS: 1635-1960
Mineral gypsum for ammonium sulfate and cement industries IS:1290-1960

USSR

Silica plasticized mortar GOST 5338-60
Cements. Methods of chemical analysis of alumina and expansive alumina cements GOST 9552-60

683 IRONMONGERY. HARDWARE

France (AFNOR)

3 stds for different types of furniture locks NF D 69-101, -112, -151

Israel (SII)

Portable kerosene cooking stoves S. I. 340

United Kingdom (BSI)

Specifications for calorifiers for central heating and hot water supply
Mild steel and cast iron BS 853: Part 1:1960
Copper BS 853: Part 2:1960
Domestic gas pokers and portable underbar ignition burners BS 3328:1961

694 CARPENTRY, JOINERY

Denmark (DS)

2 stds for oak parquet blocks: grading and dimensions DS 1024/5

Germany (DNA)

Strip flooring, parquetry DIN 280*

*Available in English

NEWS BRIEFS

ONE OF THE PIONEERING supporters of ASA's consumer goods standards program is celebrating its seventy-fifth anniversary this year. Sears, Roebuck and Company, started in 1886 by a 23-year old Minnesota station agent, now includes 11 mail order plants, 740 retail stores, and 946 catalog sales offices. In addition, it operates stores in Mexico, Brazil, Venezuela, Colombia, Peru, Costa Rica, Panama, El Salvador, and Puerto Rico. (The Sears store in Havana, Cuba, has now been taken over by Fidel Castro.) A Canadian affiliate, Simpson-Sears Limited, operates four mail order plants, 42 retail stores, and 319 catalog sales offices. The Allstate Insurance Company (auto insurance), the Allstate Life Insurance Company, and the Allstate Fire Insurance Company are subsidiaries.

The company was started 75 years ago when a North Redwood, Minnesota, jeweler refused a shipment of railroad watches and Richard W. Sears, the Redwood station agent, took them over to sell to fellow agents. Within a few months, the business had grown to the point that Sears moved to Minneapolis and opened an office. In 1887, he transferred his business operations to Chicago and hired a watch maker named Alvah C. Roebuck. Just before the turn of the century Roebuck resigned from the company because of ill health, and Julius Rosenwald, a clothing manufacturer, purchased an interest in the firm. By the time Sears retired in 1909, the company was doing $50 million worth of business annually and had established its first branch mail order plant in Dallas, Texas.

The first retail store was opened as an experiment in Chicago in 1925—a personal project of General Robert E. Wood, then a vice-president. During 1928 and 1929, the Company opened retail stores throughout the United States at the rate of one every two business days.

Standards have been a vital factor in Sears' development, making it possible for the company to maintain the quality, sizes, and functional dependability its mail order customers have expected. It has been a company member of the American Standards Association since 1941, and through its trade association, the Mail Order Association of America, has had an influential part in the consumer goods program of ASA since the early 1930's. Donald M. Nelson, at that time Sears' vice-president in charge of merchandising, and later director of the War Production Board, helped in the organization of the Advisory Committee on Ultimate Consumer Goods in 1935. This committee was the forerunner of the present ASA Consumer Goods Standards Board.

In honor of Sears, an American Freedom Center is being built at Valley Forge by the Freedoms Foundation. Ground was broken for the center at ceremonies on May 1.

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THE PAN AMERICAN Standards Committee has decided to develop and promote the use of uniform technical standards to meet specific Latin American needs. The decision was taken at a meeting in Montevideo, Uruguay, April 24-27.

The primary effort at present will be devoted to ten fields: (1) Iron and steel products; (2) Construction materials; (3) Electrical materials; (4) Automotive and railroad materials; (5) Textile fibers; (6) Sugar and alcohol; (7) Vegetable and animal fats and oils; (8) Leather and tanning materials; (9) Canned foods; and (10) Solid and liquid fuels.

John R. Townsend, president of the American Standards Association, who led the U.S. delegation, is reporting on the significance of the meeting in the next issue of THE MAGAZINE OF STANDARDS.

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FREIGHT CONTAINERIZATION for highway, maritime, and rail transportation has taken on a new dimension of interchangeability with approval of the first American Standard specifying the length, height, and width of van containers.

American Standard MH5.1-1961, Specifications for Freight Containers (Nominal Van Container Sizes), establishes nominal lengths of 10, 20, 30, and 40 feet for van containers, with a cross-section of 8 x 8 feet.

This is the first in a proposed series of American Standards in the containerization field being developed by Sectional Committee MH5, Sizes of Shipping Containers. The committee's membership represents 75 national organizations and associations, including government, carriers and shippers, labor, insurance, and manufacturers of shipping equipment.

American Standard MH5.1-1961 establishes a pattern for standards work in the field and is an essential step in establishing container dimensions. Exact sizes of van, cargo, and pallet containers will be given in standards still under development. The objective of this family of standards is to permit complete interchangeability of containers, thus expediting handling, transfer, and reshipment.

The importance of the standard was emphasized on April 28 when Thomas E. Stakem, chairman of the Federal Maritime Board, announced that all ships designed to carry cargo containers must accommodate the standard sizes of containers approved by the American Standards Association if they are to be eligible for construction subsidies or government-insured mortgages. The Maritime Administration is one of the organizations working with Sectional Committee MH5.

Mr Stakem said in commenting on his announcement: "Approval by the American Standards Association of standard sizes for van containers is of great importance to the Merchant Marine. The use of containers by ocean carriers as a means of reducing handling costs and providing shipper service is steadily growing. We expect that the publication of the standard will greatly enhance this growth by removing uncertainty as to future size trends and opening the way to complete interchangeability between rail, highway, and sea transport media."

Noting the possibility of international containerization, Mr Stakem added, "We must press with all possible speed for international standards which are so necessary for foreign commerce."

The possible development of international standards will be discussed in September at a meeting of a committee of the International Organization for Standardization in New York.

Standards work in the containerization field began in December, 1957, following a proposal submitted to ASA jointly by the American Material Handling Society and The American Society of Mechanical Engineers.

Both organizations now serve as sponsors of Sectional Committee MH5.

Some of the advantages expected as the result of containerization standards include reduction of pilferage, breakage, insurance costs, and paper work, provision for weathertight packaging, and elimination of repackaging in transit.

Copies of American Standard MH5.1-1961, Specifications for Freight Containers (Nominal Van Container Sizes), are available at $1.00.

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"AN ESSENTIAL ELEMENT of readiness"—this was what standardization was called recently. Quoted below by special permission, this statement is the personal opinion of Robert W. Young, U.S. Navy Electronic Laboratory, San Diego, California. Mr Young prepared his statement for consideration by Working Group S1-W44 on underwater reference values of Sectional Committee S1, Acoustics. He told the group:

"Most of us are concerned in one way or another with keeping the U.S. Navy in a state of readiness. I consider standardization an essential element of readiness. In any mobilization effort when large numbers of newcomers must go to work on Navy problems, both in laboratories and on ships, it seems to me that unless there is a 'Navy way' really superior to the one employed in civilian life the latter method should also be adopted in the Navy. Thus our job is also that of standardizing civilian practice."

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R. G. CHOLLAR has been named chairman of the new international technical committee on digital computers and data processing equipment, ISO/TC 97. As vice-president, research and development, of the National Cash Register Company, Mr Chollar has responsibility for all the company's product planning, research, development, and engineering activities not only in the United States but overseas as well.

R. G. Chollar

Mr Chollar served as chairman at the first meeting of ISO/TC 97, in Geneva, Switzerland, May 16-19, and at a conference of international organizations concerned with data processing on May 15, the day before the committee meeting. (A report of the meeting will be published in a subsequent issue.)

The American Standards Association, which holds the secretariat for the new international project, was represented by a delegation of 13, headed by Brian W. Pollard. Mr Pollard is director of engineering, Burroughs Corporation, Detroit.

Delegates were:

R. W. Bemer, International Business Machines Corporation, New York

Herbert S. Bright, Data Processing Group, Office Equipment Manufacturers Institute, New York

Dr J. C. Chu, Remington Rand Univac, Division of Sperry Rand Corporation, Philadelphia

Dr. Richard F. Clippinger, Minneapolis-Honeywell Regulator Company, Electronic Data Processing Division, Wellesley Hills, Mass.

John H. Howard, director, Data Processing Group, Office Equipment Manufacturers Institute, New York

John L. Jones, USAF Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio

Irving C. Liggett, International Business Machines Corporation, New York

George W. Patterson, University of Pennsylvania, Moore School of Electrical Engineering, Philadelphia

Charles A. Phillips, director, data research staff, Office of the Assistant Secretary of Defense, Washington, D.C.

R. E. Utman, director, systems programming, Remington Rand Univac Division, Sperry Rand Corporation, Princeton, N.J.

Dr A. B. Credle, manager of advanced technology, Advanced Systems Development Division, International Business Machines Corporation, Ossining, N.Y.

W. E. Andrus, Jr, manager, systems standards, IBM World Trade Corporation, New York

V. G. Grey, American Standards Association staff and secretary of the Miscellaneous Standards Board, accompanied the delegation as staff secretary.

Sectional Committee X3, Data Processing Machines (Including Digital Computers), is the group charged with formulating the U.S. viewpoint for presentation to ISO/TC 97. The Data Processing Group of the Office Equipment Manufacturers Institute, sponsor for Sectional Committee X3, is also helping to administer the secretariat for ISO/TC 97.

Mr Chollar brings to the chairmanship of ISO/TC 97, his broad worldwide experience in research and development on behalf of his company. He also brings to it a record of achievement with a variety of high-level organizations. He is president of the Industrial Research Institute and a trustee and member of the Executive Committee of the C. F. Kettering Foundation. He is also a member of the Research Committee of the National Association of Manufacturers and a member of the Advisory Committee on Plans and Policy of the Data Processing Group in the Office Equipment Manufacturers' Institute.

Mr Chollar's writings have been in the fields of chemistry (synthetic rubber, plastics, printing principles), electronics (memory systems), water conservation, and research administration.

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CARL E. NELSON, Bell Telephone Laboratories, was elected president of the National Microfilm Association at the annual meeting April 4-6. Mr Nelson is an active member of Sectional Committee PH5, Photographic Reproduction of Documents.

Other officers elected at the meeting were D. W. McArthur, Minnesota Mining and Manufacturing Company, St Paul, Minnesota, vice-president; and T. Wistar Brown, Microsurance, Inc, Philadelphia, Pa., treasurer.

Sessions of the Association's tenth annual meeting considered microfilm logistics, engineering applications, library and archives, retrieval, and basic microfilm technology. Proceedings may be ordered by writing Vernon Tate, Executive Secretary, P.O. Box 386, Annapolis, Maryland.

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THE ELECTRONIC INDUSTRIES Association has issued a call for industry comments on proposed revisions to EIA Standard SE-102 covering panel mounting racks, panels, and associated equipment. This standard was approved by ASA in 1956 as American Standard, Nomenclature and Dimensions for Panel Mounting Racks, Panels, and Associated Equipment, C83.9-1956. Information on the pro-

posed revisions can be obtained from E. L. Kossoy, chairman of the EIA Working Group P-5.6 on Racks, Panels, and Enclosures, care of the Premier Metal Products Company, 337 Manida Street, New York 59, N.Y.

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A COORDINATED research program, development of product standards, and sponsorship of the Certified Products Program formerly operated by the American Hotel Association are objectives of a new organization, the Institutional Research Council, Inc. The Council will serve large consumers of cleaning and maintenance materials, textiles, paints, and other products. It was organized by the American Hotel Association, the American Library Association, the American Motor Hotel Association, the Hospital Bureau, Inc, and the National Executive Housekeepers Association, Inc.

The Certified Products List, which has been distributed by the present members of the Council since 1959, includes 416 brand name items grouped by use—products which have been tested for compliance with established standards of quality. Many are approved American Standards. The Council's first project will be to encourage manufacturers of paints, textiles, and cleaning supplies to submit their products for listing.

In addition to the organizing members listed above, original members of the Council include the Association of College Unions, the Catholic Hospital Association of the United States and Canada, and the National Association of Hospital Purchasing Agents.

Membership is open to any person, firm, corporation, or government agency which is a consumer of supplies and materials in connection with the operation of institutional, governmental, public feeding, or public housekeeping facilities.

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U.S. STANDARDS-MAKING bodies must find a way to coordinate the work done and the knowledge gained at meetings of the International Electrotechnical Commission with the work they are doing. This was one of the points emphasized in a report of a meeting of Technical Committee 17, Switchgear and Controlgear, of the International Electrotechnical Commission, presented early this year by V.L. Cox and R.C. Van Sickle. Mr Cox and Mr Van Sickle were the U.S. delegates at a meeting of IEC/TC 17 in India, November 11, 1960.

"It is important in international trade for the guidance of both manufacturer and user, seller and buyer, to be able to have a common basis of understanding and comparison. The IEC work has this as an aim," Mr Cox and Mr Van Sickle pointed out.

"If we in United States industry expect to be a contender in the export field, thereby increasing our volume, which brings lower costs, we must make an attempt to guide the IEC standards so they will be compatible with ours, changing ours where feasible, in order that product characteristics and performance will be comparable," they declared.

"There is a general indication that the national standards organizations of the European Common Market countries and the European Free Trade Association are planning to coordinate their national standards and eliminate differences in their standards which impede trade between their countries or which reduce the benefits of lower trade barriers. It appears that the European Common Market countries are ahead in this regard, having taken steps to accept the recommendations (standards) of the ISO (nonelectrical subjects) and the IEC (electrical subjects). These moves could make it more difficult for the U.S. to influence the content of IEC standards in the future."

AMERICAN STANDARDS

Just Published . . .

If your company is a member of the American Standards Association, it is entitled to receive membership service copies of these newly published American Standards. The ASA contact in your company receives a bimonthly announcement of new American Standards, which also serves as an order form. Find out who your ASA contact is and order your American Standards through him. He will make sure your company receives the service to which it is entitled.

BUILDING AND CONSTRUCTION

Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials, Methods of Test for, ASTM D 1037-60T; ASA O8.1-1961 (Revision of ASTM D 1037-56T; ASA O8.1-1958) $0.50

Procedures for determining properties of building fiberboards; size and appearance, strength properties, shear strength, glue line shear test, moisture tests, accelerated aging, cupping and twisting, moisture content, and specific gravity.

Sponsor: American Society for Testing Materials

ELECTRIC AND ELECTRONIC

Electrical Power Insulators, Test Methods for, C29.1-1961 (Revision of C29.-1.-1944) $1.50

A manual of test procedures to be followed in making tests to determine the characteristics of insulators to be used on electric power systems. Definitions, specifications for specimen mounting, electrical, mechanical, galvanizing and routine tests.

Sponsor: Electrical Standards Board

GAS-BURNING APPLIANCES

Addenda Z21.18a-1960 to American Standard Listing Requirements for Domestic Gas Appliance Pressure Regulators, Z21.18-1956 $0.75

Sponsor: American Gas Association

MECHANICAL

Gaging Practices for Ball and Roller Bearings, B3.4-1960 (Revision of B3.4-1950) $1.00

Standard gaging practices established as referee methods to determine whether bearings conform to dimensional standards.

Sponsor: Anti-Friction Bearing Manufacturers Association

SAFETY

Maximal Acceptable Concentration of Benzene, Z37.4-1960 (Revision of Z37.4-1941) $1.00

Maximal acceptable concentration of benzene for industrial exposures of workmen, not to exceed a total of 8 hours daily. Includes brief discussion of toxic properties, sampling procedures, analytical methods, and a bibliography of technical literature on this hazard.

Maximal Acceptable Concentration of Xylene, Z37.10-1960 (Revision of Z37.-10-1948) $1.00

Maximal acceptable concentration of xylene for industrial exposures of workmen, not to exceed 8 hours daily. Includes brief discussion of toxic properties, sampling procedures, analytical methods, and a bibliography of technical literature on this hazard.

Maximal Acceptable Concentration of Toluene, Z37.12-1960 (Revision of Z37.12-1943) $1.00

Maximal acceptable concentration of toluene for industrial exposures of workmen, not to exceed 8 hours daily. Includes brief discussion of toxic properties, sampling procedures, analytical methods, and a bibliography of technical literature on this hazard.

Sponsor: American Industrial Hygiene Association

In Process . . .

As of May 8, 1961

BUILDING AND CONSTRUCTION

In Standards Board

Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units, Specifications for, ASTM C 126-60T; ASA A101.1- (Revision of ASTM C 126-59T; ASA A101.1-1960)

Sponsor: American Society for Testing Materials

Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs, Specifications for, ASTM D 226-60; ASA A109.2- (Revision of ASTM D 226-56; ASA A109.-2-1956)

Asphalt-Saturated Asbestos Felts for Use in Waterproofing and in Constructing Built-Up Roofs, Specifications for, ASTM D 250-60; ASA A109.4- (Revision of ASTM D 250-56; ASA A109.-4-1956)

Woven Cotton Fabrics Saturated with Bituminous Substances for Use in Waterproofing, Specifications for, ASTM D 173-60; ASA A109.12- (Revision of ASTM D 173-44; ASA A109.12-1955)

Sponsor: American Society for Testing Materials

Refractory Materials, Methods of Chemical Analysis, ASTM C 18-60; ASA A111.2- (Revision of ASTM C 18-52; ASA A111.2-1955)

Sponsor: American Society for Testing Materials

CINEMATOGRAPHY

American Standard Approved

Screen Luminance for Indoor Theaters, PH22.124-1961

Sponsor: Society of Motion Picture and Television Engineers

In Board of Review

35mm Photographic Sound Motion-Picture Film, Usage in Projector, PH22.3- (Revision of PH22.3-1954)

16mm 3000-Cycle Flutter Test Film, Photographic Type, PH22.43- (Revision of PH22.43-1953)

Intermodulation Tests for 16mm Variable-Density Photographic Sound Prints, PH22.51- (Revision of Z22.51-1946)

Nomenclature for Motion-Picture Film Used in Studios and Processing Laboratories, PH22.56- (Revision of Z22.-56-1947)

Sponsor: Society of Motion Picture and Television Engineers

Reaffirmation Being Considered

A and B Windings of 16mm Film, Perforated One Edge, PH22.75-1953

Sponsor: Society of Motion Picture and Television Engineers

CONSUMER GOODS

In Standards Board

Liquid Toilet Soap, Specifications for, ASTM D 799-60T; ASA K60.14- (Revision of ASTM D 799-51; ASA K60.-14-1952)

Sponsor: American Society for Testing Materials

DRAWINGS, SYMBOLS AND ABBREVIATIONS

In Standards Board

Guide for Selecting Greek Letters Used as Letter Symbols for Engineering Mathematics, Y10.17-

Sponsor: American Society of Mechanical Engineers

ELECTRIC AND ELECTRONIC

In Board of Review

Fuseholders, Safety Standard for, C33.10-

Sponsor: Underwriters' Laboratories

Schedules of Preferred Ratings for Power Circuit Breakers, C37.6- (Revision of C37.6-1959)

Sponsor: Electrical Standards Board

In Standards Board

Single and Heavy Vinyl-Acetal-Coated Round Copper Magnet Wire, C9.5- (Revision of C9.5-1955)

Single and Heavy Vinyl-Acetal Nylon Coated Round Copper Magnet Wire, C9.12-

Vinyl-Acetal Self-Bonding Round Copper Magnet Wire, C9.13-

Sponsor: National Electrical Manufacturers Association

Wet-Process Porcelain Insulators (Suspension Type), C29.2- (Revision of C29.2-1955)

Wet-Process Porcelain Insulators (Spool Type), C29.3- (Revision of C29.3-1955)

Wet-Process Porcelain Insulators (Strain Type), C29.4- (Revision of C29.4-1955)

Wet-Process Porcelain Insulators (Low- and Medium-Voltage Pin Type), C29.5- (Revision of C29.5-1955)

Wet-Process Porcelain Insulators (High-Voltage Pin Type), C29.6- (Revision of C29.6-1955)

Wet-Process Porcelain Insulators (High-Voltage Line-Post Type), C29.7- (Revision of C29.7-1955)

Wet-Process Porcelain Insulators (Apparatus-Cap and Pin Type), C29.8- (Revision of C29.8-1957)

Wet-Process Porcelain Insulators (Apparatus-Post Type), C29.9- (Revision of C29.9-1957)

Sponsor: Electrical Standards Board

Reaffirmation Being Considered

Enamel-Coated Round Copper Magnet Wire, C9.1-1953

Cotton-Covered Round Copper Magnet Wire, C9.2-1953

Silk-Covered Round Copper Magnet Wire, C9.3-1953

Nylon-Fibre-Covered Round Copper Magnet Wire, C9.4-1953

Heavy Vinyl Acetal-Coated Rectangular and Square Copper Magnet Wire, C9.6-1955

Double-Paper Single Cotton-Covered Rectangular and Square Copper Magnet Wire, C9.7-1955

Sponsor: National Electrical Manufacturers Association

Volume Measurements of Electrical Speech and Program Waves, C16.5-1954

Antennas, Methods of Testing, C16.11-1949

Frequency-Modulation Broadcast Receivers, C16.12-1949, with supplement C16.12a-1951, Methods of Testing for Effects of Mistuning and Downward Modulation

Vehicular Communications Receivers, Methods of Testing, C16.18-1951

Amplitude-Modulation Broadcast Receivers, Methods of Testing, C16.19-1951

Television Signal Levels, Resolution, and Timing of Video Switching Systems, Methods of Measurement, C16.-20-1951

Aspect Ratio and Geometric Distortion of Television Cameras and Picture Monitors, Methods of Measurement, C16.23-1954

Sponsor: Institute of Radio Engineers

Preferred Values for Components for Electronic Equipment, EIA GEN-103; ASA C83.2-1949

Piezoelectric Crystals, Terminology for, 49 IRE 14. S1; ASA C83.3-1951

Fixed Wire-Wound Resistors, Recommendations for, EIA REC-117; ASA C83.6-1955

Variable Control Resistors, Recommendations for, EIA REC 121-B; ASA C83.7-1955

Sponsor: Electronic Industries Association

American Standards Reaffirmed

Designation System for Metal Electron Tube Shells, C60.4-1950

Rating Values of Interelement Capacitances, C60.8-1952

Sponsor: Joint Electron Devices Engineering Council

American Standards Withdrawn

Electron Tubes, Methods of Testing, C60.5-1952

Gas-Filled Radiation Counter Tubes, Methods of Testing, C60.11-1954

Noise in Electron Devices, Methods of Measuring, C60.13-1954

Sponsor: Electron Tube Council of the Joint Electron Device Engineering Council

MATERIALS HANDLING

American Standard Approved

Freight Containers (Nominal Van Container Sizes), Specifications for, MH5.1-1961

Sponsors: American Material Handling Society; American Society of Mechanical Engineers

MATERIALS AND TESTING

In Standards Board

Rockwell Hardness of Plastics and Electrical Insulating Materials, Method of Test for, ASTM D 785-60T; ASA K65.3- (Revision of ASTM D 785-51; ASA K65.3-1959)

Specific Gravity of Plastics, Methods of Test for, ASTM D 792-60T; ASA K65.8- (Revision of ASTM D 792-50; ASA K65.8-1959)

Sponsor: American Society for Testing Materials

MECHANICAL

American Standards Approved

Addendum B3.11a-1961 to American Standard Method of Evaluating Load Ratings for Ball and Roller Bearings, B3.11-1959

Sponsor: Anti-Friction Bearing Manufacturers Association

In Standards Board

Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines, Specifications for, ASTM B 16-60; ASA H8.1- (Revision of ASTM B 16-58; ASA H8.1-1959)

Sponsor: American Society for Testing Materials

MEDICAL

American Standard Approved

Anesthetic Equipment: Endotracheal Tube Connectors and Adapters, Z79.2-1961

Sponsor: American Society of Anesthesiologists

METALLURGY

In Standards Board

Zinc-Coated (Galvanized) Steel Tie Wires, Specification for, ASTM A 112-59; ASA G8.4- (Revision of ASTM A 112-33; ASA G8.4-1935)

Zinc-Coating (Hot-Dip) on Iron and Steel Hardware, Specifications for, ASTM A 153-60; ASA G8.14- (Revision of ASTM A 153-59; ASA G8.14-1959)

Sponsor: American Society for Testing Materials

Uncoated Wrought Iron Sheets, Specifications for, ASTM A 162-60T; ASA G23.1- (Revision of ASTM A 162-39; ASA G23-1939)

Sponsor: American Society for Testing Materials

Gray Iron Castings, Specifications for, ASTM A 48-60T; ASA G25.1- (Revision of ASTM A 48-56; ASA G25.1-1956)

Sponsor: American Society for Testing Materials

Nickel-Steel Plates for Boilers and Other Pressure Vessels, Specifications for, ASTM A 203-60; ASA G33.1- (Revision of ASTM A 203-56; ASA G33.1-1956)

Sponsor: American Society for Testing Materials

Mild-to-Medium-Strength Carbon-Steel Castings for General Application, Specifications for, ASTM A 27-60; ASA G50.1- (Revision of ASTM A 27-58; ASA G50.1-1959)

Sponsor: American Society for Testing Materials

High-Strength Steel Castings for Structural Purposes, Specifications for, ASTM A 148-60; ASA G52.1- (Revision of ASTM A 148-58; ASA G52.1-1959)

Sponsor: American Society for Testing Materials

Electrodeposited Coatings of Lead on Steel, Specifications for, ASTM B 200-60; ASA G53.8- (Revision of ASTM B 200-55T; ASA G53.8-1956)

Sponsor: American Society for Testing Materials

MISCELLANEOUS

In Standards Board

Thermometers, Specifications for, ASTM E 1-60; ASA Z71.1- (Revision of ASTM E 1-60; ASA Z71.1-1960)

Sponsor: American Society for Testing Materials

PHOTOGRAPHY

In Board of Review

General-Purpose Exposure Meters (Photoelectric Type), PH2.12- (Revision of PH2.12-1957)

Sponsor: Photographic Standards Board

Temperature and Temperature Tolerances for Photographic Processing Baths, PH4.5- (Revision of PH4.5-1953)

Sponsor: Photographic Standards Board

100-Foot Reels for Processed 16mm and 35mm Microfilm, Dimensions for, PH5.6-

Sponsor: American Library Association

Speed Classifications for Intraoral Dental Radiographic Film: Diagnostic Grade, PH6.1-

Sponsor: American Dental Association

In Standards Board

Dimensions for Photographic Flashlamps ASA Type 240, PH3.38-

Sponsor: Photographic Standards Board

PIPE AND FITTINGS

In Standards Board

Standard Strength Unglazed Clay Pipe, Specifications for, ASTM C 261-60T; ASA A106.4- (Revision of ASTM C 261-59T; ASA A106.4-1960)

Clay Pipe, Methods of Testing, ASTM C 301-60T; ASA A106.5- (Revision of ASTM C 301-55; ASA A106.5-1955)

Sponsor: American Society for Testing Materials

AMERICAN STANDARDS PROJECTS

Safety in Skin and SCUBA Diving—

A general conference called by ASA at the request of the Compressed Gas Association has recommended that the American Standards Association initiate a project to develop safety standards for skin diving and SCUBA diving (diving with self-contained underwater breathing apparatus).

The discussion at the conference, held April 27, indicated the need for standard markings and colors for equipment such as floats and flags, and standards for pressure in tanks and for the purity of the air used. In addition, it was pointed out that there is a need for standardization of statistics concerning diving accidents, and it was suggested that the proposed ASA project might develop a standard report form for doctors to fill out. A number of other problems were discussed, including the use of oxygen and unauthorized filling of tanks, and standardization of valve connections. It was pointed out that American Standard B57.1-1957, Compressed Gas Cylinder Valve Outlet and Inlet Connections (CGA V-1), provides standard connections for different types of gases in order that no mistake can be made in filling the cylinders. This standard undoubtedly can be adapted for oxygen tanks used in diving.

On unanimous vote of the conference, the Compressed Gas Association was recommended as sponsor of the proposed project. The Navy Underwater School and the Navy Experimental Diving School have both offered their services as consultants.

The recommendations of the conference are being referred for action to the ASA Safety Standards Board.

Electron Tubes, C60—

Sponsor: Joint Electron Devices Engineering Council

Virgil M. Graham has taken office as chairman and Jean Caffiaux as secretary of Sectional Committee C60. Mr Graham is associate director of engineering and Mr Caffiaux is staff engineer for the Electronic Industries Association.

A member of ASA's Standards Council, Mr Graham has a long and productive history of work on standards. He has served as chairman of the Joint Electron Device Engineering Council (formerly JETEC) of EIA and NEMA. He is chairman of the Communications and Electronics Section of the Electrical Standards Board and vice-chairman of the Board itself. He is also vice-president of the U.S. National Committee of the International Electrotechnical Commission, and chairman of IEC Subcommittee 39-2, Semiconductors.

In ASA work, Mr Graham serves as chairman of Sectional Committee C94, Semiconductor Electron Devices, as well as C60.

Mr Graham is a Fellow of the Institute of Radio Engineers, the Institution of Radio Engineers (Australia), the Standards Engineers Society, and the Radio Club of America. He is also a member of a number professional societies in the electrical, acoustical, and photographic fields in this country, and of the Societe des Radioelectriciens (France).

Virgil M. Graham

Mr Caffiaux provides guidance and staff assistance to some 200 engineering committees of the EIA. He is also concerned with liaison with other standardizing agencies, and is secretary to the JEDEC Electron Tube Council.

He has held a number of offices in the Standards Engineers Society both at the sectional and national levels. For four years he served as national secretary of the Society, and currently is a director-at-large and a member of the Executive Committee.

Mr Caffiaux is a senior member of the Institute of Radio Engineers.

Thirteen American Standards on electron tubes have been approved by ASA on recommendation of Sectional Committee C60. These are standards developed by the Institute of Radio Engineers, the Electronic Industries Association, or by joint committees of EIA and NEMA.

Electric Lamps, C78—

Sponsor: Electrical Standards Board

A year's trial use of two proposed American Standards on 48- and 72-inch rapid-start fluorescent lamps has been recommended by industry preparatory to consideration by the American Standards Association for final approval of the standards in 1962.

The proposed standards specify dimensional and electrical characteristics of both 48-inch and 72-inch (1.5 ampere) T-12 and PG-17 rapid-start fluorescent lamps. Use of the proposed standards on the industrial level throughout the year will provide the sectional committee with material with which to evaluate fully the application of the standards and their technical acceptability.

Both standards specify lamp designations, dimensional and operating characteristics, and starting requirements, the latter covering single-lamp ballasts, ballasts for two lamps in series, and ballasts for three lamps in series.

Copies of the proposed standards—Proposed American Standard Dimensional and Electrical Characteristics of 48-Inch (1.5 Ampere) T-12 and PG-17 Rapid-Start Fluorescent Lamps, C78.705 and Proposed American Standard Dimensional and Electrical Characteristics of 72-Inch (1.5 Ampere) T-12 and PG-17 Rapid-Start Fluorescent Lamps, C78.706—may be obtained for 40 cents each.

Calibration of Measuring Systems—
Requested by Bureau of Ships, Department of the Navy

The Bureau of Ships' request that a new project on calibration of measuring systems be initiated by ASA, has been approved by a general conference and sent to the Mechanical Standards Board for action.

The proposal seeks standardization of terminology and calibration standards for flowmeters, temperature-measuring instruments used under severe flow stresses, pressure gages using Bourdon tube sensing elements in very high or abnormally low pressures, and liquid level instruments,

taking into account marine environments such as pitch and roll. Other applicable uses would be in the aviation, chemical, and petroleum fields.

It has been recommended that the American Society of Mechanical Engineers serve as sponsor of the new project if it is approved.

Vermiculite Concrete—

Requested by the Vermiculite Institute

A new project on standard specifications for vermiculite concrete has been recommended by a conference of groups concerned. It is expected that the scope will refer in general to the use of concrete containing vermiculite as the only aggregate.

The recommendations of the conference are being referred to the Construction Standards Board for action.

Personal Safety—

The American Standards Association will take an active part in a proposed international project on protective clothing and equipment if the recommendations of a general conference held April 26 are followed.

The conference considered the proposal originated by the British Standards Institution for organization of a project by the International Organization for Standardization. In making the suggestion, the ISO submitted 14 BSI standards for consideration. Seven proposed subjects have been listed for work by the proposed project. These are, in order of priority: (1) Safety boots and shoes; (2) Eye protectors; (3) Safety gloves; (4) Safety belts and harness; (5) Respirators for use in atmospheres containing gas, dust, or toxic chemicals; (6) Protective equipment for use against radiation during welding operations; (7) Flameproof clothing.

It was pointed out during the conference that a number of American Standards fall within these subjects. These include the war standards for protective clothing, L18 and for protective occupational footwear, Z41.

The recommendation of the conference that the American Standards Association participate in the proposed new international project is being submitted to the Safety Standards Board for action.

Dimensional Metrology—

Requested by The American Society of Mechanical Engineers

At the recommendation of a general conference April 11 a proposal that ASA initiate a new project on dimensional metrology has been submitted to the Mechanical Standards Board for action. The conference recommended that the work be confined to calibration and specific conditions relating to the subject. However, it would include inspection and means of measuring the characteristics of the geometrical configurations, such as lengths, plane surfaces, angles, circles, cylinders, cones, and spheres.

In its proposal, ASME noted that the principal classifications of dimensional metrology include basic metrology research, general metrology research and development, and industrial metrology research, development, and standardization. Considerable research and study is anticipated, according to I. H. Fullmer, chief of the metrology division of the National Bureau of Standards. Mr Fullmer, who represented the ASME at the conference, also gave the National Bureau of Standards' viewpoint.

The immediate need, ASME pointed out, is for a standard covering temperature, descriptions of features or specifications for optimum systems of room temperature control and insulation for the dimensional laboratory, for a survey detailing the specifications as well as terminology, and for methods of measuring geometrical forms.

Protection of Heads, Eyes, and Respiratory Organs of Industrial Workers, Z2—

Sponsors: National Bureau of Standards; U.S. Navy Department; U.S. Bureau of Mines

A request by the Sports Car Club of America that ASA initiate a new project on safety helmets for sports car drivers has led to a series of suggestions on the existing Z2 project.

The Z2 project already contains a section on head protection. Therefore, it has been proposed that this new subject be referred to the Z2 sectional committee.

Consideration was also given to the suggestion that the Z2 project might become too complicated and too cumbersome. At a conference April 26, called to consider the proposal for a project on safety helmets for sports car drivers, it was agreed to recommend to the Safety Standards Board that the Z2 project be split into three separate projects. These would be:

(1) Head protection, with the Sports Car Club of America and the U.S. Department of the Navy as joint sponsors.

(2) Eye protection, with the National Bureau of Standards as sponsor.

(3) Respiratory protection, with the Bureau of Mines as sponsor.

The new project on head protection would include the section on this subject from the present Z2 project and would also be concerned with head protection in car racing and two-wheeled vehicle use.

American Standard Specification for

Rigid Aluminum Conduit

ASA
Reg. U.S. Pat. Off.
C80.5-1960
*UDC 621.315.671:669.71

Erratum

The Note under Table 1 pertaining to Outside Diameter should be as follows:

Outside Diameter: + 1/64 inch or — 1/32 inch for the 1½-inch and smaller sizes;
± 1 percent for the 2-inch and larger sizes.

May 5, 1961

AMERICAN STANDARDS ASSOCIATION
INCORPORATED
10 East 40th Street, New York 16, N. Y.

ED71

The recommendations of the conference are being submitted to the SSB for action.

Safety Glazing Materials, Z26—
Sponsor: Insurance Institute for Highway Safety.

Six task groups have been appointed to make studies of the glazing materials used in automobile windows, doors, and windshields. The groups are charged with determining the degree of safety, durability, impact resistance, visibility, energy absorption, egress characteristics, and fracture characteristics of these materials.

Arthur S. Johnson, chairman of Sectional Committee Z26, and member of the Board of Governors of the Insurance Institute for Highway Safety, explains: "The objective of the Z26 committee is to make certain that the safety standard for automobile glass is the best. Specifically, these task groups have been charged with objectively evaluating the history of the American Standard for safety glass approved in 1950, and updating it, if necessary."

"Since both laminated safety glass and tempered safety glass are used in motor vehicles, both will come under the present study," Mr Johnson reports.

The sectional committee is also setting up a finance committee to secure funds to underwrite the research to be done by the task groups.

The subjects to be studied and the chairmen of the task force groups which will study them are listed below.

1. J. C. Widman, Ford Motor Company—injuries caused by or involving glazing materials.
2. J. S. Nelson, Monsanto Chemical Company – fracture characteristics of glazing materials on impact.
3. Dr Joseph D. Ryan, Libbey-Owens-Ford Glass Company—visibility properties of glazing materials.
4. Griffith Bowen, E. I. duPont de Nemours & Company, Inc—energy absorption of glazing materials.
5. Captain Robert King, Virginia State Police—egress characteristics of glazing materials.
6. Henry M. Richardson, DeBell and Richardson, Inc—glazing material durability.

Sectional Committee Z26 has functioned since 1934, and glazing in automobiles has followed the American Standard first introduced in 1935. The small "AS" etched in all automobile windows is indicative of its national acceptance.

STANDARDS ALIVE

A Guest Column

by FULTON R. MAGILL

JOINT EFFORT by purchasing, engineering, and manufacturing can develop company standards which will save time and money not only for them but for the company and for their customers. True company standards no longer represent the arbitrary decisions of an engineer isolated from the others in his company. Instead, they represent the views of manufacturing, purchasing, and engineering, and take into consideration many other factors, including a great variety of existing standards. Despite the work of the American Standards Association to coordinate standards on the national level, there is still a great confusion of standards. There are suppliers' standards, technical society standards, trade association standards, government standards of several designations, national standards, and international standards. They can all be different. Company standards select from this variety, specify the practices and requirements called for by the company's special needs, and provide a guide for engineering, purchasing, and manufacturing.

To be effective, of course, company standards must be used.

Not long ago, for example, our standards division found that some company divisions were still ordering hex head cap screws from the old American Standards rather than from the company's standard which put into effect the revised edition. The old standard cap screws had now become specials, purchased at extra cost to the company.

Some time ago, the suppliers of screws adopted Unified threads. Our central standards section released these new standards to the various divisions. But the first shipment of round head machine screws made with Unified threads was rejected by one of the inspection departments. Purchasing had ordered a standard screw but had not followed the method of designating screw threads shown in the company's standard. The result was a misunderstanding, and loss.

In preparing a company standard for high-strength, high-temperature tap end studs, we found we could select from four types of body diameters covered by IFI standards. At the nut end, the threads were covered by two different American Standards, API, MSS, and IFI standards, plus our own company practices. The threads at the tap end were covered by another assortment of standards.

Company standards eliminate confusion and establish the "just right" solution for company problems which affect all of us—purchasing, engineering, and manufacturing. But the company's standards job would be made more effective if ASA could bring about greater coordination on a national level among the variety of standards now in existence.

Mr Magill is manager of the Central Standards Department, Rockwell Manufacturing Company.